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TRANSACTIONS

OF THE

New York State Agricultural Society,

WITH AN

ABSTRACT OF THE PROCEEDINGS

OF THE

COUNTY AGRICULTURAL SOCIETIES

PART II.

VOLUME XXVII—1867.

ALBANY:
VAN BENTHUYSEN & SONS' STEAM PRINTING HOUSE
1868.

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1869. April 24

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REPORTS

OF

COUNTY SOCIETIES

ALBANY.

ALBANY, *March* 10*th*, 1868.

COL. B. P. JOHNSON, *Secretary State Agricultural Society:*

The thirteenth annual fair of the Albany County Society was held on the Washington Parade Ground, in this city, during the 16th, 17th, 18th, 19th and 20th days of September, 1867. The building was about one-third larger than on the previous year and nearly double the size of those usually used by the Society; yet, it was filled to its utmost capacity, and most of the farming implements had to be placed out upon the grounds.

The interest manifested by the substantial farmers and manufacturers of the county was very encouraging and flattering to those having the management of the Society. And with the exception of the previous year the exhibition far surpassed those preceding. The building was in the shape of a T, the main building being three hundred by sixty feet, and the stem one hundred by sixty feet. Part of the stem was occupied as a floral hall and beautifully fitted up.

The rest of this portion of the building was set apart for the exhibition of farm products, fruits and vegetables. The main building was used for the exhibition of manufactured articles, and the entries in this department were so numerous that it became necessary to encroach upon the other portion of the building. The different exhibitions in this department were unusually large and handsome, the exhibitors vieing with each other to make the finest display.

In the centre of the building was placed the cabinet of curiosities; which was gotten up with a great deal of labor and very good taste, and was one of the chief attractions of the fair. The exhibition

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of farm implements, though not so large as the previous year, was very good. In the stock department the exhibitions were very fine and very encouraging for the Society; many farmers from the farthest portion of the county exhibiting, who had not exhibited before in years.

The exhibition of poultry was much larger than ever before. The trial of steam fire engines on the last day of the fair created a great deal of interest and was a very interesting feature of the fair.

At the request of a large number of merchants and manufacturers of the city and county, the officers decided to award no premiums in the manufacturer's department. It was believed by many that this was the wiser course. But, though the trial was very favorable and all wished to have the experiment tried; yet, the officers and most of those who heretofore favored the idea have no hesitation in saying that they do not believe it could be continued with success. During the evenings of the exhibition the building was beautifully lighted with gas, and a band added to the pleasure of the evenings by their excellent music. The evening exhibitions were in every respect a splendid success. The number of entries were: in the manufacturer's department, 244; in the stock department, 475; in the domestic department, 255; in the horticultural department, 258; total, 1,232. The receipts and disbursements of the Society for the year were:

Receipts	$8,450 06
Disbursements	8,400 75
Balance	$49 31

The annual meeting was held at Clarksville, January 29th, 1868, at which the following officers were unanimously elected: President, Henry Creble, of New Scotland; Secretary, David De Graff; Treasurer, John McHarg.

The officers upon retiring from their positions deem it a duty as well as a privilege to again thank you for the uniform kindness and courtesy you have extended to them and to express the hope that you may long honor the position you now occupy and so faithfully and creditably fill.

Most respectfully, yours, &c.,

JOHN C. NOTT, *Secretary.*

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ALLEGANY.

Angelica, *January*, 1868.

To Col. B. P. Johnson, *Secretary New York State Agricultural Society*:

The twenty-third annual exhibition of the Allegany County Agricultural Society was held on the Society's grounds, in the village of Angelica, September 25th and 26th, 1867.

The weather on the first day was cold and stormy and had a tendency to keep many away that would otherwise have come. The second day opened under more favorable auspices and the attendance was large from all parts of the county. The show of cattle was not large but of a superior quality. The exhibition of sheep was very good, but not what it ought to be for a county like Allegany. The display of stallions was superior to any former year both in numbers and quality. The exhibition of teams, brood mares, colts and single horses was creditable to the county. Swine were shown in limited numbers, but of a good quality. The display of fruits, vegetables and cereals, though not extensive, were of unusually good quality. The exhibition of butter and cheese was not what it should have been, nor what was to have been expected from one of the first dairy counties in the State. The department of implements and machinery was quite small. The ladies' show of paintings, embroidery, &c., including all kinds of handiwork, was not large.

The treasurer's report represents the finances of the Society to be in a healthy condition.

Treasurer's Report.

1867, Feb. 1.		
Cash on hand		$21 9¢
Receipts during the year		1,138 70
		$1,160 66
Disbursements, including premiums, &c.	$619 41	
Cash, balance on hand	541 25	
		1,160 66

The following officers were elected for the year 1868: S. H. Whitcomb, President; D. P. Richardson, Secretary; James Lockhart, Treasurer.

D. D. GARDINER, *late Secretary.*

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BROOME.

The President, Secretary and Treasurer of the Broome County Agricultural Society hereby transmit to the Secretary of the New York State Agricultural Society a statement of the transactions of said Broome county Society for the year 1867, as follows:

The receipts for the year have been as follows:

Received from late treasurer	$1 48
Received for tickets sold at fair	781 75
Received for rent of ground	55 00
Received from State treasurer	87 50
	$925 73

The expenditures for the year have been as follows:

Premiums	$269 63	
Rent of ground interest	258 52	
Other expenses	192 61	
		720 76
Balance		$204 97

Officers for 1868: President, O. C. Crocker, Binghamton; Secretary, S. F. Cary, Binghamton; Treasurer, W. M. Ely, Binghamton.

W. M. ELY, *Treasurer.*

CAYUGA.

AUBURN, *December* 31, 1867.

The past year for this Society has been one of unusual prosperity. It has now become one of the permanent as well as one of the chief institutions of the county. The people are solicitous of its interests, and look forward, with impatience, to the holding of its annual exhibitions. The exhibition for this year was held on the 17th, 18th and 19th of September, and excellent weather, good roads and a large number of entries combined to make it successful.

The annual meeting for the election of officers was held on the 14th day of December. The treasurer reported the financial state of the Society to be in a healthy condition.

The receipts for the year have been	$1,939 61
Disbursements	2,068 11
Due treasurer	$128 50

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The following officers were elected for the ensuing year: President, Allen D. Morgan, Auburn; Secretary, Amaza B. Hamlin, Auburn; Treasurer, Larnard C. Mann, Auburn.

JOHN G. HOSMER, *Secretary.*

CATTARAUGUS.

LITTLE VALLEY, *March* 4, 1868.

To HON. B. P. JOHNSON, *Secretary New York State Agricultural Society:*

SIR—The twenty-sixth annual fair of this Society was held on the grounds of the Society, in the village of Little Valley, on the 11th, 12th and 13th of September last. The routine of our fair was similar to that of former years, and we have the pleasure of reporting it a decided success. In the horse department there were 143 animals entered. The show of matched horses was very fine. The exhibition of stallions, single carriage horses, saddle horses, mares and colts, was very creditable. Among the number was a Hambletonian stallion, six years old, owned by Heman Swift, Esq., of Versailles, which was awarded the first premium, and was pronounced by all to be an animal of superior merit.

The show of cattle, in both number and quality, was very creditable. Lorenzo Stratton, Esq., of Little Valley, had on exhibition thirty head from his celebrated herd of pure Devons, which attracted much attention.

Mr. Stratton has attained to marked success in domesticating the elk and other wild animals. He is now the possessor of an extensive *minkery*, from which he realizes large profits.

The show of sheep was small, though excellent in quality, especially of the long-wool breeds.

The swine show was hardly equal to some former fairs, though the few specimens on exhibition were good and well bred.

The ladies' department was well filled, and reflects much credit on the "fair sex" of our county.

The exhibition of vegetables, fruit, grain and dairy products was very fine.

The attendance was large and the weather fine, excepting a shower about three o'clock the last day, which dispersed the crowd rather hastily.

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The annual address was delivered at one o'clock, the third day, by Oscar W. Johnson, Esq., of Fredonia. The address was an excellent one—practical and full of valuable instruction—and was listened to with deep attention by the large crowd of farmers and others who listened to its delivery.

The receipts from all sources are	$1,382 30
Expenditures	699 38
Leaving a balance in the treasury on the 31st day of December, 1867, of	$682 92

The Society is free from debt, with a fair-ground of ten acres paid for, and bids fair for future usefulness.

The annual meeting of the Society for the election of officers was held at the Gano House, Little Valley, the first Saturday in January last, and the following were elected officers of the Society for 1868: C. A. Snow, President, Conewango; Horace S. Huntley, Secretary, Little Valley; Erastus N. Lee, Treasurer, Little Valley.

H. S. HUNTLEY, *Secretary.*

CHAUTAUQUA.

To the Secretary of the State Agricultural Society of the State of New York:

In obedience to the requirements of chapter 425 of the Laws of the State of New York, passed April 13, 1855, the undersigned beg leave to submit the following report:

That on the 26th, 27th and 28th days of September, 1867, the Chautauqua County Agricultural Society, and the Chautauqua Farmers' and Mechanics' Union, held a union fair on the grounds of the last named society, at the village of Fredonia in said county.

That during said fair it was voted that the next exhibition of the County Society be held at Fredonia aforesaid, in connection with the Chautauqua Farmers' and Mechanics Union; at which meeting the then acting officers were re-elected for the ensuing year.

That during said fair there were received 1,135 entries. That the receipts of said fair were as follows:

Rent of stands	$203 00
Entries	309 75
Tickets	1,772 86
Total receipts	$2,285 61

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Expenses	$756 31	
Premiums	1,158 50	
Amounting to		$1,914 81
Leaving a balance of		$370 80

Officers for 1868: President, L. L. Hyde, Fredonia; Secretary, John S. Russell, Fredonia; Treasurer, H. C. Crane, Fredonia.

JOHN S. RUSSELL, *Secretary.*

CHEMUNG.

The whole am't rec'd from all sources by the treasurer was		$1,300 87
Received by Wm. H. Philips		513 47
Received by T. M. Wilcox		103 00
Total amount receipts		$1,917 34
The whole amount expended by treasurer on account of the Society was	$804 32	
Expended by Wm. H. Philips, for buildings, &c.	513 47	
Expended by T. M. Wilcox, lumber, &c.	103 00	
Balance on hand	496 55	
		1,917 34

A. T. ARNOT, *Treasurer*

CHENANGO

To the Secretary of the New York State Agricultural Society:

The annual fair of the Agricultural Society of the county of Chenango was held on the new grounds of the Society, in the village of Norwich, on the 24th, 25th and 26th days of September, 1867. At no time since the formation of our association had the officers of the same made greater exertions for a successful exhibition of all the productions of the soil and the works of art than on this occasion—the yearly festival of the farmers and mechanics of our county.

The season had been auspicious; the fruits of the earth abundant, and the sunny faces of the well-clad men and fair women from the hills and valleys of this and some other counties never wore a more joyous appearance than during those three festive days—three days, most fortunately, of fairer weather than had been

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enjoyed by our people on any similar occasion for several years before.

Our premium list had been revised and increased; our grounds improved; great pains taken in the appointment of committees, and the President of the Agricultural Society of the State engaged to deliver the address. The final result has been one of the most successful agricultural exhibitions ever held in our county.

JUNE FAIR.

Cash on hand		$662 52
Admissions		713 95
Other sources		210 43
		$1,586 90
Premiums paid	$732 00	
Expenses	423 95	
Cash on hand	430 95	
		1,586 90

SEPTEMBER FAIR.

Cash on hand		$430 95
Receipts		1,210 78
		$1,641 73
Premiums paid	$634 37	
Other expenses	745 53	
Cash on hand	261 83	
		1,641 73

Officers for 1868: President, Hiram Hale, Norwich; Secretary, Gerard S. Mead, Norwich; Treasurer, T. D. Miller, Norwich.

E. A. BUNDY, *President*

CLINTON.

PLATTSBURGH, N. Y., *January* 20, 1868.

To the Executive Committee of New York State Agricultural Society, Albany:

I have the honor to submit the following report of the Clinton County Agricultural Society for 1867:

The state of the Society at the commencement of 1867 was as follows: "A county society organization and no funds." A meeting of the executive committee was held in this village on the 18th of April, and it resolved "that a cattle show and fair be held on Wednesday and Thursday, the 25th and 26th days of September next, at Plattsburgh."

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The committee set to work in earnest, and all arrangements were completed, and the fair held on the above mentioned days. The weather was unfavorable, and only 230 entries were made. There had been no fair held in the county for six years, but a strong feeling has been awakened among the farmers of the county, and it is expected that brighter days are at hand.

The receipts of the Society for the year were $734, and the expenditures $528.12, leaving a balance in the treasury of $205.88.

Officers for the coming year: John D. Platt, President; Zept. C. Platt, Treasurer; S. B. Miller, Secretary.

Respectfully,

R. BAILEY, *Secretary*

COLUMBIA.

Hon. B. P. JOHNSON:

SIR—The 27th annual fair of the Columbia County Agricultural Society was held at Chatham Four-Corners, Sept. 10th, 11th, 12th and 13th, 1867. The weather on the morning of the first day was lowry, and doubtless much stock and many articles from a distance remained at home on this account. However, it cleared away before noon, and there was perhaps an average show. Whatever was lacking in the exhibition, there was no lack of people. They came in multitudes, and seemed to enjoy themselves decidedly well.

Financially the fair was a success. It paid the current expenses, over $1,600 in premiums, and over $1,300 on the Society's debt. Total receipts, $3,822.48; expenses, 3,790.80.

For the first time in years the officers enforced the law against outside attractions and obstructions along the streets leading to the fair. The result was so agreeable that it will doubtless be repeated.

On the third day of the fair the Hon. Charles L. Beale delivered an address.

January 6, 1868, the following officers were elected for the year: President, Stephen G. Bushnell, Chatham Four-Corners; Secretary, A. Ashley, Jr., Chatham Four-Corners; Treasurer, J. Wesley Jones, Chatham Four-Corners.

Yours truly,

N. H. THOMAS, *Secretary*.

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CORTLAND.

CORTLAND, *December* 31, 1867.

B. P. JOHNSON, Esq., *Secretary, &c.:*

The annual meeting of the Cortland County Agricultural Society was held at the court house, December 31, 1867.

The following officers were elected for the year 1868: President, Alfred L. Chamberlain, Cortland; Secretary, P. B. Davis, Cortland; Treasurer, Morgan L. Webb, Cortland.

The following is the treasurer's report:

1867.	
Paid premiums and expenses June exhibition	$1,152 99
Paid premiums and expenses of September fair	1,007 69
Amount due for unpaid premiums	105 00
Balance to account 1868	914 83
	$3,180 51
Balance account from 1866	$716 08
Received from five life members	50 00
Received from June horse exhibition	1,337 99
Received for rent of grounds	85 00
Received from annual fair	972 74
Received for pasturage of grounds	18 70
	$3,180 51
Dec. 31. Balance to account of 1868	$914 83

MORGAN L. WEBB, *Treasurer.*

DELAWARE.

B. P. JOHNSON, Esq.:

DEAR SIR—It is with feelings of great satisfaction we make the twenty-seventh annual report of the Delaware County Agricultural Society, which held its fair, September 17, 18 and 19, in the village of Walton, where it is located for the next four years.

The weather was favorable and the attendance very large. The officers were greatly encouraged by the interest manifested. The exhibition was good, perhaps never better, taking all departments as a whole. There were entered 156 head of cattle of various grades. The show of horses was grand, there being 90 entries of horses and colts, all good and some very superior. The exhibition of sheep, swine and poultry was ordinary. Of mechanical work

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there was a good display. The ladies' hall, which, for a number of years, has been good, was this year very superior. The articles were too numerous to mention, and showed great taste and skill in execution.

The annual address was delivered by Solon Robinson, and all who are acquainted with his name know we had a rare treat. His address was both able and instructive.

The Society offered for the year 1867 over $1,500 in premiums. The treasurer's report shows:

Cash on hand commencement year		$229 42
Receipts of fair		1,044 45
Receipts from other sources		173 00
		$1,446 87
Premiums paid	$841 00	
Expenses	445 37	
Cash, balance	160 50	
		1,446 87

The annual meeting of the Society for the election of officers for 1868 was held in the court house at Delhi, January 1st. The following were elected officers: President, William B. Dowie, Andes; Treasurer, G. W. Hanford, Walton; Secretary, Porter Frisbee, Delhi.

Yours truly,
PORTER FRISBEE.

DUTCHESS.

Mr. B. P. JOHNSON, *Secretary*.

In submitting this, the annual report of proceedings of the Dutchess County Agricultural Society, it is gratifying to announce that it yet receives a generous support from many friends, both in and out of the county; that the efforts of its managers have been bountifully sustained, and that its affairs are in a prosperous and promising condition. Such it has been for many years, but as time rolls on, each succeeding year brings it new friends and supporters, adds increased contributions to our exhibitions and increased interest to the institution itself. Its grounds, buildings and fixtures, having a central location, gives general satisfaction. Its friends have been steadfast, and it may not be too much to say that its officers have been faithful to their trust, at least the results have been such as to enable them to enjoy that opinion. Within the

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year the managers, feeling a confidence in the future support of the institution, ordered the erection of a new hall upon its grounds at Washington Hollow. The work was commenced early in the spring and was but just completed in time for the fair. It stands twenty feet from the old hall, and is connected with it by a handsome covered passage-way. Its form is a double octagon, eighty feet in diameter; six wide door-ways, with piazzas over them all; turreted roof, with windows above and below, that secure abundant light and ventilation. The inside arrangements are very complete. All around, next the siding, except at the doors, are tables, four feet wide; then a strong oak rail put up on a true circle to protect them; there are walks entirely round, twelve feet wide; then another rail; then another table in a circle, five feet wide; then within an area, thirty feet in diameter, for the hall committee, with centre-table and other fixtures for their convenience. Four gates, from different directions, lead through the railing and tables into the area; over the tables and around the building are ropes, hooks, slats and other fixtures for the display of whatever may present itself. It was built especially for the display of the finer articles; and our first year's experience proved that the plan of the building fully met all our expectations. It was filled with such articles as are usually exhibited; and all agreed that they showed to good advantage. For showing pictures, the plan is almost perfect, the light coming in from above. Its cost was over $7,000. With our present buildings, stables, sheds and other fixtures, that has taken many years to secure, we are now ready to display to advantage whatever may be brought for that purpose. The contributions to to our last exhibition were such as to test fully the capacity and convenience of our arrangement.

The elements favored us, and the fair opened on the 17th of September and lasted for four days. Our exhibition exceeded, in most respects, all former fairs of the Society. Nearly every department was well represented. It must be admitted that the central point of attraction was the new hall and its contents. Its ample space was well filled, but nothing seemed crowded. The only department deficient was fruit, and no one could be blamed for that, as it did not grow. The old hall was filled with farm implements of various descriptions, stoves, and vegetables. Out of doors the various stock departments were filled to a degree that left no cause of complaint. I cannot let the subject pass without noticing briefly some of the prominent exhibitors and their animals

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exhibited. Daniel B. Haight, Wm. J. Griffin, Isaac Akin, P. A. Skidmore, and others, had short horns, highly creditable to them as breeders. Mr. Geo. Ayrault had forty head of grade, fat and working cattle. His contributions for this year were never, as a whole, beaten by himself or other exhibitor. Others exhibited animals of rare excellence, both as to quality and condition. Mr. J. D. Wing and Mr. Isaac Akin exhibited long-wool sheep. Mr. D. B. Haight, Mr. G. Ayrault and Mr. A. Moore had middle wools. Mr. C. Haight took the lead in Merinos; Wheeler & Pixley, Saxons and Silesians, and Mr. Geo. Ayrault, cross-bloods, common and fat sheep. It is gratifying to record that, in these days when the tendency of the age seems to be to amusements and excitements, the departments of agriculture, which the founders of the Society intended to foster and improve, are receiving such efficient support. In the horse department there is no abatement of interest. Trotting was allowed, and the exhibition upon the track was such as to draw the attention of very many in attendance.

On the afternoon of the third day, the philosopher of the *Tribune*, the Hon. Horace Greeley, appeared and delivered an earnest and interesting address upon the practical duties pertaining to agricultural improvement. It was listened to with profound attention.

Officers elected for the year 1868: President, William W. Haxtun, Poquaque P. O.; Treasurer, Thomas W. Jaycox, Wappinger's Falls; Secretary, Geo. Sweet, Washington Hollow.

Respectfully submitted,

GEO. SWEET, *Secretary.*

ERIE.

OFFICE OF THE ERIE COUNTY AGRICULTURAL SOCIETY.

R. P. JOHNSON, Esq., *Secretary New York State Agricultural Society:*

DEAR SIR—The annual exhibition of the Erie County Agricultural Society for the year 1867 was held in Springville, September 17, 18 and 19, on the grounds leased by the Union Agricultural Society. The attendance was not as large as that of last year. However, the show of stock was better than that of former years.

The display of horses, which took place on the second day, was good, showing an increased interest in the breeders of that noble

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animal. The exhibition of cattle was good, though not large, and some fine blood was exhibited. The show of sheep was well represented, and creditable to the wool-growers of the county. The fruit and vegetable department was well represented, especially apples. A great variety of these were on exhibition, Mr. Samuel Willett, of East Hamburgh, showing several specimens of apples, pears, &c. There were some fine specimens of grain and roots, though the competition in this class was not large.

The ladies' department was much better than that of last year. Specimens of household industry, economy and good taste were to be seen throughout this department, and which adds very much to the interest of the Society. There was also on exhibition several kinds of sewing machines, all of which were highly spoken of by the judges. Also, fine specimens of house and church organs.

The annual address was delivered on the third day by Hon. Burt Vanhorn, of Lockport, N. Y., and was attentively listened to by an intelligent audience, and was one of the best productions of agricultural addresses ever delivered before the society.

Trotting for sweepstakes came off at three o'clock, and some fine specimens of speed were shown.

The officers of the Society are as follows: L. C. P. Vaughn, President, Springville; Pliny Smith, Treasurer, Springville; Bertrand Chafee, Secretary, Springville.

Total receipts of the annual fair	$928 40
Expenses and premiums paid	897 67
Balance in treasury	$30 73

BERTRAND CHAFEE, *Secretary.*

ESSEX.

To B. P. JOHNSON, Esq., *Secretary New York State Agricultural Society:*

The eighteenth annual fair of the Essex County Agricultural Society was held at their new fair grounds at Westport, October 2d, 3d and 4th, 1867.

Two years have now elapsed since the Society renewed its vigor under the favorable auspices of its new location. During that period it has grown in prosperity and gathered strength with each succeeding year, until it has secured a permanence which now

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makes it an honor to the county and gives promise of successive years of usefulness.

The success which attended the fair was more marked than on any previous occasion. The list of entries was about 350, which number has not been exceeded, and many of the articles on exhibition of superior quality. Floral Hall was well filled with a great variety of interesting and useful articles too numerous to particularize. The exhibition of fruit and vegetables was large and fine. The cattle show was meagre. There was an excellent show of horses. The display of sheep and swine was not large, but fair in quality. The exhibition of dairy products was small, but superior in quality.

The total receipts of the Society, including rents, membership, &c., were $995.64.

Amount paid for premiums and purses	$690 89
For fencing, rent and repairs	330 75
Other expenses	169 00
	$1,190 64

The annual meeting was held February 27th, at which the following officers were elected for 1868: Thomas Walton, President; B. B Richards, Secretary; James A. Allen, Treasurer.

Respectfully submitted,

B. B. RICHARDS, *Secretary.*

FRANKLIN.

MALONE, FRANKLIN COUNTY, N. Y., *December* 10, 1867.

B. P. JOHNSON, Esq., *Secretary of New York State Agricultural Society:*

DEAR SIR—The sixteenth annual fair of the Franklin County Agricultural Society was held on the Society's grounds, in Malone, on the 2d, 3d and 4th days of October, 1867. The attendance was larger than ever before, in fact, crowding our grounds almost to their utmost.

The exhibition of stock showed a marked degree of quality, though the numbers in some classes were less than last year. Oxen, cows, sheep, swine and poultry proved that the farmers of our county appreciate blood and condition, and that they were not

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to be outdone by any. Sheep and swine were of such superior quality as to excite the admiration of all. Young cattle, such as two year olds, we think, did our locality great credit; while the lovers of horses, either for single or double driving, or for purposes of draught, felt that they were looking at animals not inferior to any. The display of fruit proved one fact to a demonstration, that apples, pears, plums and grapes can be grown here in our cold latitude, in such profusion and of such quality, as to satisfy the taste and demands of any palate or stomach. Vegetables were in such numbers and of such superior quality, as almost to defy competition or description. There were several very fine samples of hops on exhibition, showing that the hop growers of our county understand the culture and curing of hops almost to perfection, and that we have been favored beyond other sections in escaping the havoc made by the insect. The hop interest in our county has been growing very rapidly for the past few years, adding greatly to the wealth of the county. Many of the growers have realized $1,000 per acre for this year's crop.

The ladies of our county cannot be too highly commended for the rich and varied display of flowers, paintings, drawings, crotchet work, needle work, patch work, knitting, embroidery, carpeting, flannel and fulled cloths, while the exhibition of photographic pictures by artists, Fay and Farmer and Ferris, were unsurpassed in the State. The exhibition in Mechanics' Hall filled the building to its utmost capacity, each article showing a marked progress.

The afternoon of the last day of the Fair was devoted to hearing an address from Hon. J. L. Bigelow, of Watertown, and to the award of premiums. The address was one of marked character and ability, breaking out from the common routine of agricultural addresses, saying things not usually said on such occasions, creating in us a desire for another of the same sort, thoroughly practical; and one which if carried out in the farmer's and mechanic's life; would prove a source of blessing.

The whole am't rec'd from all sources during the year was..	$2,913 25
Amount on hand from last year.....	1,048 00
	$3,961 25

Amount of disbursements during the year for premiums, repairing buildings, &c.....	$2,758 35
Amount in hands of treasurer	1,202 90
	$3,961 25

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Officers for the year 1868: President, Thomas R. Kane, Burke; Secretary, Smith T. Palmer, Malone; Treasurer, M. S. Mallon, Malone.

THOS. R. KANE, *President.*

S. T. PALMER, *Secretary.*

FULTON.

JOHNSTOWN, *March* 4, 1868.

B. P. JOHNSON, Esq., *Secretary of New York State Agricultural Society:*

DEAR SIR—The Fulton County Agricultural Society held their annual fair at Johnstown, 26th, 27th and 28th of September, 1867. The show in some departments was very fine and creditable and in others somewhat lacking and scarcely an average with other years. In horses, cattle and sheep a fine exhibition; but in the domestic and floral departments the show was rather slim.

The officers elected for 1868, are: President, Henry R. Snyder, Johnstown; Secretary, John J. Davidson; Treasurer, N. P. Wells.

Obediently yours,

ISAIAH YANNEY

GENESEE.

BATAVIA, *April* 12, 1868.

B. P. JOHNSON, *Secretary New York State Agricultural Society:*

SIR—I herewith submit the following report of the Genesee County Agricultural Society for the year 1867, viz:

1st. The Society never was in more prosperous condition and this in a great measure is owning to the untiring industry and zeal of the retiring President, Sanford Wilber, Esq., who in every sense of the word was the right man in the right place.

2d. The Society still continues to hold its yearly fairs and the twenty-seventh annual re-union was held on the 18th and 19th of September, 1867, at the Society's grounds, in Batavia.

The grounds, &c., owned by the Society are all paid for and no debt, whatever, exists against the institution.

It is unnecessary to go into a detailed account of the fair or of the articles exhibited, as it would only be a repetition of the usu l stereotyped phraseology.

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It is proper, however, to mention that the number of articles exhibited was larger than for several years previous, and people were not backward in making entries for premiums. The display of cattle, sheep, horses and swine was very good indeed and more of it than usual.

An immense concourse of people were present on both days, and all seemed satisfied with the proceedings.

The following is a condensed exhibit of the financial condition of the Society, on 1st January, 1868, viz:

RECEIPTS.

Cash in the treasury, Jan. 1, 1867	$503 80
Received from State	115 00
Received at fair, Sept. 18 and 19	1,514 56
All other sources	288 00
	$2,421 36

DISBURSEMENTS

Paid for permanent improvements, &c	$505 36
Paid for premiums at fair	1,274 90
Paid all expenses of year	416 10
Cash on hand, to balance	225 00
	$2,421 36

The following are the officers for the year 1868, viz: Addison Foster, President; Orlo R. Clark, Secretary; Jerome Thompson, Treasurer.

All of which is respectfully submitted,

ORLO R. CLARK, *Secretary.*

GREENE.

ACRA, GREENE COUNTY, N. Y.,
February 5, 1868.

B. P. JOHNSON, Esq., *Secretary New York State Agricultural Society:*

DEAR SIR.—Enclosed please find a copy of the proceedings of Greene County Agricultural Society. The officers for the present year, are: Peter P. Snyder, President, East Durham; Geo. W. Russ, Secretary, Acra; E. E. Derby, Treasurer, Cairo.

You will see from the report of the Treasurer, that financially, the fair was not so much of a success as those of 1865 and 1866.

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Considerable interest was manifested, and on the whole the exhibition was commendable, though not so good as we anticipated. The opening day of our fair was so warm (I may say hot) that only those who were deeply interested in our society and its objects, and proof against *coup de soleil* came out. Another great detriment to our prosperity was the organization of a kindred local institution, in the most populous town of our county, composed of men who had been first and foremost with us. Their interests being identified with their institution, and their desire to make their affair pay, with the influence at their command, operated seriously against us.

As soon as the farmers and mechanics of our county see the difference between an institution devoted to their interests and one which is a money-making operation for a few, then I think we shall regain our former prosperity.

Truly yours,

GEO. W. RUSS, *Secretary.*

Annual Address.

BY REV. O. B. HITCHCOCK, OF WINDHAM.

Mr. President, and Gentlemen of the Greene County Agricultural Society:

Standing in the presence of the men of Greene, who have had a life-long experience in cultivating the soil, I may well feel some hesitation in addressing you on this occasion; nor can I entertain the expectation, on a subject with which you are so well acquainted, to present any new truths or facts, with which you are not already familiar.

The benefit to you to be derived from this fair is not to be traced to any opinions I may express, but from using your own powers of observation, and by taking counsel together. Here you see the products of other farms, and compare them with your own; you see the improved tools newly invented for agricultural use, by a judicious choice of which much of hardship and inconvenience in farming may be avoided.

The true principles of tillage are much better understood than they once were. Since Sir H. Davy, in 1845, discovered that the soil contained a variety of ingredients, established principles have taken the place of guess work. These elements of matter contained in the soil have, since that time, been constantly undergoing

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scientific investigation, until now their properties, use, and relation to the growth of vegetation, are very well understood. In England, and on the old lands of the Continent, it has long been known that success in farm husbandry depended on returning to the soil in some form what it had lost by taking off crops. In the older States of the Union the conviction of this truth is becoming very general. The census tables show that the wheat crop of New York has fallen off in the average product from thirty to forty bushels per acre to eight. Lands that were long productive have been reduced to barrenness. Large tracts of land in Virginia, once very fertile, have been abandoned, because exhausted by a course of culture not guided by a correct knowledge of agriculture. A succession of tobacco crops, raised by shallow plowing, without manuring, and without rotating with other crops, used up the surface soil, and compelled the proprietors to transfer their operations to new lands.

Both in this country and in England it is now regarded by well-informed men as an established fact, that that labor alone which is directed by scientific knowledge can yield a fair return. The English landholders, a limited number of educated men, understand and insist upon thorough, systematic cultivation of their land as the only way to derive profit from their capital. Here, however, where the farmer both owns and tills his own land, such knowledge to be available, must be generally diffused.

The agriculturist should be so far acquainted with chemistry, geology and chemical physiology as to derive instruction from their suggestions, and understand their explanation of the processes which he performs, if he would reap all the advantage which science is capable of bringing to his aid.

The more densely peopled districts of Europe understand this, because increased production has become with them a necessity. Chemical analysis of the impoverished soils, compared with a similar analysis of those which still retain their fertility, showed what constituent parts had been abstracted; and this ascertained, it remained only to find by a similar process what fertilizers contained the needed elements of repair, leaving for the agriculturist only the practical part of obtaining and applying them.

The farmers of Cheshire, the richest cheese district in England, perceived that the yield of their dairies was steadily diminishing, notwithstanding all that they could do to prevent it. They applied to scientific men for aid; analysis showed that the phosphates of the soil had all been converted into milk, or the bony structure of their

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herds, so that, although many other elements of fertility remained in the soil, the special substances demanded by the nature of the consumption carried on, being gone, those which remained could not supply the deficiency. In their zeal to renovate their soils, they sought out all depositories of the substances which their land wanted. The dust of Waterloo, and other great battle-fields, was shipped and spread on their farms, and in this way the primitive richness of their pastures was restored.

The science of the composition of rocks, which is one department of geology, and the science of the composition of soils, which is one department of chemistry, are closely allied. One defines the general agricultural character of a region by showing of what materials the rocks consist; the other, by the reductions of the laboratory, the presence of the minuter elements, lime, magnesia, soda, &c., on which both its general fertility and adaptation to special crops depend.

The superficial tillage of our soils has not taxed their productive capacity to its fullest extent. The surplus population migrate and settle upon new lands, or flock to the cities. Those who remain to cultivate the soil of the older States, have been able to check its deterioration only by careful tillage, and a more judicious and liberal use of fertilizers. This tendency, early perceived by the more intelligent farmers and friends of agriculture, led to the establishment of journals and societies for the collection and diffusion of useful practical information on farming, gardening, fruit growing, &c. The names of Judge Buell, Beekman, B. P. Johnson, Geddes, Anthony Van Bergen, John Talmage Delafield, John Stanton Gould, John A. King, and other like influential and public spirited citizens, are associated with the rise and progress of improved farming in this State.

Previously, farmers followed the traditions of the past; valuable in many respects, because embodying the results of long experience, but tinctured with superstitious notions, and resting on no settled principles. The founders of our new agricultural system desired to substitute scientific principles in place of empiricism, to enlarge the sphere of individual experience, correct it by means of a wider induction, and through the agency of systematic instruction and voluntary societies to make the whole farming community at once the beneficiaries of and contributors to this branch of productive industry.

There are other reasons why a knowledge of soils, of fertilizers,

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the relative value of different breeds and kinds of stock, should be reduced to certainty, and well understood. The successful application of mechanical science to the construction of agricultural implements and machinery for the house, the work-shop, and the farm, necessitates improved preparation and treatment of land, at the same time that it relieves the farmer from much exhausting manual labor, and affords greater opportunity for study and reflection, which this no less than other professions deserves and will reward.

The farmer who devotes the labor of years to a farm, trusting to experience as a guide, will acquire a knowledge of its particular qualities and requirements, just as he will of the peculiarities of a horse or cow, such as no one else can possess; but it is of no permanent value, for the knowledge dies with him, or is rendered obsolete by a long course of tillage, and by climatic changes which materially affect the conditions of successful farming.

Upon new soils, where large areas have a similar location, and are uniform in quality, the kind of crops best adapted to the soil, and the most successful methods of cultivation are so well established that the methods of scientific farming are anticipated, and little needs to be done except to secure the farmer against the hazard of exhausting his land of its most valuable and limited ingredients, by carefully attending to the rotation of crops.

Where the soil is light and easily impoverished, with much diversity of position and structure, no farmer can safely imitate those about him. Independent, intelligent management is required. Whatever aid agricultural science can furnish should be promptly accepted. He may not be able to acquire a knowledge of chemical analysis, or become an expert in the study of rocks, or be able to adapt fertilizers to the soils where they properly belong. There are too many demands upon his time in carrying on the manifold branches of farm work. No one, more than the enterprising farmer, feels the deficiency of early education, especially the want of that instruction which he needs to fit him for the business of life. There is reason to hope that this defect will be in some degree remedied by the wider dissemination of agricultural journals, of treatises of a popular yet scientific character, and by the agricultural schools which are now in existence or in process of establishment in this and other States. The projectors of the New York State Agricultural College, having the benefit of previously tried but imperfect plans, and having made themselves acquainted with the models of

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those of the highest repute abroad, we are encouraged to hope that they may be able to meet the wants of the vast agricultural interest of this State.

In some parts of the country there are large tracts of untouched soil yet to be brought under the plow. The improved do not equal the unimproved lands, but large amounts are donated in railroad grants, and given to the States for educational purposes. Furthermore, fifty millions of acres were added to the cultivated domain of the United States between 1850 and 1860; so that the time cannot be very remote when improved agriculture will have to be relied on for increased production, a result to be effected only by the application of the principles of agricultural chemistry to the production of food.

The farming community needs to be brought into closer relationship with those few thorough scholars who make the composition of soils and their products a scientific study. The young farmer needs some better guide than conjecture, and ought not to be satisfied with imitation. He should not be a mere copyist of others, though not indifferent to this source of information. He needs to be able to decide intelligently what to adopt and what to reject. Thus only can he be truly independent, or assuredly prosperous; for successful farming on the old soils is henceforth to be scientific, as well as practical. He is surrounded by elements and materials abounding in nutrition. The store-house of nature is full of riches, and agricultural science holds the key.

Improvements which are feasible on some farms, and in some sections of country, are not so in all. *Eg.:* Drainage, were it generally practiced in the eastern part of the county, in the valley of the Hudson, would add greatly to its productiveness and value, while west of the mountains the land has a natural drainage, or is not of sufficient depth to render it practicable.

While our uplands remained in forest the force of the rain fall was broken by the interposing shield of leaf-clad trees, and the surface soil held in place by the absorbing capacities of leaves and decaying trees, all bound together by the strong net-work of fibers and roots; but once cleared of wood, the soil laid bare by the plow, the finer portions (in which most of its fertility consists) are soon washed away. From their location, it is difficult to restore what is thus lost to the uplands, which are still further impoverished by a succession of grain crops and pasturage. Besides the direct value of woodland for fuel and lumber—a value rapidly increasing—

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it fulfils an important office in retaining the surplus water of rainy seasons, giving it off gradually into adjacent streams, tempering the heated air by evaporation, and through its effect on the humidity of the atmosphere increasing the deposit of dew.

The traveler in the East perceives the ruinous results of denuding an agricultural region of its forests. The barren hills are furrowed to the naked rock, and the stony beds where once flowed the perpetual current of the mountain stream are furrowed more and more deeply by the rushing torrents of the rainy season. Yet the geological character of that region—limestone, lava and bituminous rocks—is such as indicate soils of the highest fertility, and such was once the agricultural character of that region. The goat, the last domestic animal which survives in an impoverished region, destroys the young shrub that would, if spared, grow up a cedar of Lebanon, or an oak of Bashan, re-clothe the barren hills with living verdure, bring back the dew and summer showers, and renew the fertility of a land which once "flowed with milk and honey."

Greene county, east of the mountains, comprises a section of the valley of the Hudson; that part west of the mountains belongs to the Delaware and Chenango midland district, a region nearly uniform in character, and adapted by its configuration and quality to wool growing and dairying—the latter being the chief and growing farming interest in this hilly section of the State.

Its surface is a succession of broken ranges of hills, with irregular, narrow valleys between; the disintegrated red rock forms the principal mineral part of the soil, a soil of no great depth or strength, but warm and early, and more easily worked than the stiff clays of the Hudson basin. It is very susceptible to improvement, repaying well the labor and money spent to enrich it. The quality of the dairy stock has been much improved within a few years by the introduction of other breeds, by judicious crossing, and by careful selection of young stock with which to keep up the herds. Still, the *quantity* of milk is too generally the test; the use of the lactometer would weed out many a large but watery milker, by determining the comparative richness of each cow's milk. Sheep raising fluctuates with the price of wool; few pure Saxony or Merinos are kept, our manufacturers not being able to compete with Europe in the production of high priced woolen fabrics.

Our dairymen, to increase their hay crops, use all their manures for this purpose, apparently forgetful of the fact that their pastures are all the while losing their richness; the phosphates of the soil

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are not returned to the pastures by the animal, but are converted into milk and the bone of the growing stock; only those elements of fertility which are not needed (and they are of poor quality) are restored, unless artificially supplied. One of our best farmers, recently a president of your Society, has set the example of applying fertilizers to his pasture lands, and with beneficial effect.

You have done well in selecting for your presiding officers men of executive ability not only, but practical agriculturists as well. If, because of distance and inconvenience of transportation, the towns in the interior have contributed less than their share to the articles on exhibition, they have furnished a succession of active and efficient presidents, who have spared neither time nor labor to make this and preceding fairs worthy of the agricultural position of the county, and a benefit to its inhabitants. If they, by indifference, fail to sustain, or permit it to be merged in a local organization at one extremity of the county, the fault will not be owing to failure in duty on the part of the officers of the Society—nor theirs the injury, the reproach, the dishonor. I trust that the day is far distant when this organization shall be dissolved; that many years will witness such gatherings as this to-day; that its friends of other days will still stand by it and endeavor to increase its utility, faithful to its interests, like the venerable ex-president of the Society, the Hon. Zadock Pratt, who favors us with his presence to-day. The recipient of medals and testimonials from this and other States, and from foreign lands; successful as a tanner, nor less so as an agriculturist, his presence and history teach the young men of to-day that self-reliance, good habits, independence and perseverance are the guides to a successful career; and who, after holding high positions in the public servive, and giving an only son to die for his country, yet lingers to inspire us by his fortitude, to instruct by his experience, and kindle emulation by his well won honors.

The subject of scientific education in agricultural schools, on an equal footing with those which were established for other purposes, was agitated in this State many years ago. Just thirty years since, a committee, consisting of Judge Buel, Jacob Center, Dr. Beekman and Anthony Van Bergen of Coxsackie, was formed, whose duty it was to collect subscriptions, select a site and prepare a plan of operations. The committee met with such success in obtaining subscriptions that they selected a site at the mouth of Kinderhook creek, on the banks of the Hudson; but no further progress was

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made until 1844, when Dr. Beekman, then President of the State Agricultural Society, chose for the topic of his official address "The Importance of Agricultural Education." Acting upon these suggestions, John T. Delafield, Esq., drew up a plan of organization which was adopted, and a charter was obtained from the State Legislature. Mr. D. proposed to make the education thorough not only in theory but in practice, and to place it at a rate within the reach of farmers in moderate circumstances. The course was intended to include the fundamental laws which underlie the science and art of husbandry, as well as the adjunct sciences. The pupils were to be employed in the field a portion of the time, and to receive wages. The carrying out of this wise design was interrupted by the death of Mr. D. in 1853, The Secretary of the State Agricultural Society, B. P. Johnson, Esq., and the members of the executive committee, urged the adoption of the plan, and procured a grant of $40,000 from the Legislature, in 1856. A like sum was raised by private subscription, and a tract of 400 acres purchased near the village of Ovid, on the border of Seneca Lake. At the breaking out of the rebellion it was just commencing active operations. Public attention was diverted from the yet immature institution, but was recalled to the subject by the large land-grant to the several States, by Congress, in 1863, for the establishment of agricultural colleges in each. The act provides that public lands, not exceeding 30,000 acres to each Senator and Representative, be appropriated to the several States, the proceeds of the sale of such lands to be invested in stock of the United States, or of the States, or other safe stocks yielding not less than five per cent, and that the moneys so invested are to constitute a perpetual fund, the capital of which is to remain forever undiminished, the interest to be appropriated to the endowment, support and maintenance of at least one college where the leading object shall be "to teach such branches of learning as are related to agriculture and the mechanic arts, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life." Congress also established a Department of Agriculture at Washington, to acquire and diffuse useful information among the people, and also to procure and distribute valuable seeds and plants.

There was a sharp contest in our State Legislature on the question of the disposal of this fund. The institution at Ovid, the People's College at Havana, the Genessee College at Lima—each claimed it, or a share in it. as did other institutions, on the ground

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of having a department of agricultural instruction appended to their course of study.

In this emergency, when the munificent grant of Congress seemed likely to be frittered away among rival claimants, Hon. Ezra Cornell, a member of the State Senate, offered, on condition of being allowed to locate the institution, to add to the $1,000,000, at which the land was estimated, half a million of dollars additional; which liberal gift, on the acceptance of his proposal, was increased to three-quarters of a million. The Congressional land-grant has been located, under his supervision, in white pine lands in Wisconsin.

The main buildings of the college are rising on an elevated site near the head of Cayuga lake; an efficient president is organizing the institution; a board of trustees has been selected with great care from New York city, and various parts of the State. It is amply endowed, projected on an enlarged and liberal scheme, after visiting the most noted institutions of a similar character in Europe, and after schools in other States have become well established.

One of the most eminent benefactors, both of English and American agriculture, is Professor F. W. Johnston, whose series of lectures first introduced our farmers to the methods of improved agriculture abroad. A scarcely less eminent name is that of the late Professor Norton, of New Haven, to whose lucid exposition of agricultural chemistry the officers of our State Society acknowledged their indebtedness.

It was under such influences that American farming ceased to be stationary. Scientific knowledge has been popularized, theories subjected to the test of experiment, and public attention directed to the composition of the soil, drainage, and the renovation of worn out lands. The publications devoted to agriculture and the mechanic arts have also assisted to establish a higher grade of farming. The annual State and county fairs are the natural expression of a growing industry, and furnish an accurate register of the farming interest in the various sections of the State.

The fair is the farmer's exchange. It is by its agency that improved stock, implements and machinery are promptly brought to the public notice, and are not long confined to the locality where they originate. Such a means of diffusing information is demanded in a county that does not possess a good collection of farming tools for sale within its limits.

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The expensive work under the title of the Natural History of the State, long in progress under the supervision of men eminent in each department, furnishes an immense mass of valuable materials, not, however, in a form to be directly available to the people.

Where there is one farmer in a neighborhood who conducts his business in a superior manner, he will not pass unobserved. If his stock is superior, his tools of better pattern; if his crops are heavier and surer, there will be a lively interest felt in his operations; leaves of grass and grain are plain to read. When Benjamin Franklin wrote by the side of a field of clover "*this has been plastered*," he justified his reputation for practical judgment.

The aim of business men is to gain the greatest possible publicity, and in pursuance of this idea the benefits of co-operation have been ascertained.

Enlightened self-interest will prompt any man who compares the superior stock, the skillfully devised implements and contrivances to lighten labor, with the inferior quality of his own, to make an effort at improvement. It is important that improvement be general, in order to be effectual. To extirpate noxious weeds does little good unless there is united effort. In Canada the laws require each farmer to keep his land clear of the thistle. The location of lands rarely permits a farm to be thoroughly drained without the co-operation of neighboring farmers. The necessity of a frequent change of seed, and the danger of introducing seeds, indicates another advantage to be gained by united action in farming.

Perfection comes by practice; in this, as in other pursuits, many trials, many failures, before success.

The main defect in farm machinery is want of simplicity in construction. They are more trouble than profit. Pieces of complex mechanism that will answer for the shop and factory, where they are stationary, and have trained operatives to manage them, are unfitted for the farm, where the opportunity for practice is limited. Something that boys and hired men can manage is wanted. Inventors need not expect to introduce largely among farmers any labor-saving machine which a plain man cannot operate, or no one but an engineer keep in order.

The statistics in the department of agriculture gave, in 1860, in round numbers, 164,000,000 acres improved land, having a cash value of $6,500,000,000; value of farm implements, $200,000,000; value of live stock, $1,500,000,000. The production of cereals in

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the South is much greater than formerly—one of the first results of the emancipation of labor being to diversify industry. Their chief staples will be grown more successfully when their methods of cultivation are corrected and guided by science.

The productive industry of the North has been largely reinforced by immigration. On its present scale of magnitude it is comparatively of recent date. The number arriving in this country during the ten years prior to 1800 may be estimated at 50,000. The census of that year gave a population of a little over 5,000,000. From 1800 to 1830 the number of immigrants is reckoned at 184,000, About this time the power loom was brought into use in this country; manufactures were being established; the policy of the country was shaped so as to develop and foster a diversified industry, raising the immigration from 1820–30 to 640,000. This number was trebled from 1830–40, quadrupled from 1840–50, the entire emigration to that date being nearly 5,500,000, a larger number than the whole population of the country at the beginning of the century.

The foreign born population has sent back to relatives in the Old World $50,000,000 in ten years, through bankers and other public financial agents. An equal amount, perhaps, has been sent by private channels—an index of the amount of property they have acquired.

This influx from abroad has tended to the diversification of industry, since its elements were drawn from all trades and handicrafts, introducing a large amount of skilled, and a yet larger amount of unskilled labor.

Our only foreign customer to any amount is England, and her agriculture is in advance of ours. She takes from us sparingly, at the lowest possible rates, and then only when, having exhausted her own supply and the surplus of her colonies, she is compelled to complete her supplies here. Not seven in one hundred bushels of the wheat grown in the United States will be found in a foreign market; the rest must be marketed at home. The Northwest has this year 100,000,000 bushels of wheat, a production greater than that of England or France, by less than one-half their population. Chicago, a city which twenty years ago had hardly a recognized existence, is now the greatest primary grain depot in the world; its exports being nearly twice as great as those of St. Petersburgh, and exceeding those of Galatz and Ibrail combined. And Chicago is

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but one of many centers for the receipt of agricultural produce direct from the producer. St. Louis, Cincinnati, Cleveland, Buffalo, Rochester and New York must be taken into account, if we would gain an idea of the agriculture of the United States. Millions of acres yet await the hand of the farmer, to add their contribution to the sustenance of man. The laboring classes of other countries do not generally own the soil they till, especially in Great Britain—the great mass of agriculturalists are laborers, not land owners, expected to remain stationary, the mere instruments by which scientific farming is carried on, to enrich the landlords of the realm—a policy of injustice which in Ireland is bearing bitter fruit—which brought to us, as it is bringing there, sore retribution. In vain do they strive to keep the servile yoke on the neck of the toiling millions, to whom belongs equally with their self-appointed masters the birth-right of freedom.

The old order of things is passing away; England, moved by the power which she cannot resist, enfranchises her millions, and asserts henceforth the Divine right—not of kings—but of the people.

In the plan of existence a place is allotted to the moral as well as the material wants of man, else the simple structure of society would be complete with the meadow, the factory, the store and the market. It is more complex. Provision must be made for the cultivation of the rational elements of our being, and while referring to the physical advancement and resources of State and nation, there may well be asked the question whether the elevation of the people in all that dignifies and adorns human nature, shall keep pace with increasing wealth, and attain a development commensurate to their financial and industrial progress. When the hostile elements of the country are harmonized; when a new enterprise may move freely where it is needed, without repulse; when ignorance shall disappear, and vice with crime only be stamped with dishonor; when each good right hand in the nation shall help to build her greatness; and of all our millions, one and all sharers of the common inheritance, shall do their work not as servants, but as sons, the new era upon which we are entering will have been fully inaugurated. The multitudinous labor of a self-contained hemisphere, its superabundant riches overflowing upon other lands, and a people to whom every race contributes its distinguishing characteristic to appear inwrought with the matured national character.

And then, enlarged, improved, ennobled by science, and per-

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fected by a succession of generations, agriculture will hold the foremost rank among the productive forces of the nation; yet in perfect accord with every legitimate interest, inwoven with all good and honest pursuits, and with them forming the great circle of American industry.

HERKIMER.

R. P. JOHNSON, Esq., *Secretary of the New York State Agricultural Society:*

DEAR SIR—According to requirement, I beg leave to present to you the following report of the transactions of the Herkimer County Agricultural Society for the present year, or since our last report:

The annual meeting for the election of officers was held on the 12th day of January last, at which time the principal officers of the preceding year were again unanimously re-elected, viz: Ezekiel Spencer, Esq., President; Dr. Eli Fox, Secretary, and I. Quackenbush, Treasurer. In addition to the officers mentioned, several competent and active persons, from various towns of our county, were chosen to act in concert with the above named officers as an executive committee. There was, also, at the same time, a committee appointed, consisting of five gentlemen and four ladies, for the purpose of revising our premium list, and who were instructed to report at a future meeting of the executive committee. The report was subsequently made, and, with slight alterations, adopted. The premiums were considerably increased over those of former years, especially upon neat cattle and articles of domestic manufacture. You will perceive, by examining the accompanying schedule or report of premiums awarded and paid by us, that we are holding out all the inducements we can to create an interest in our fair. You will also observe that we are very liberal in our premiums on horses, horned cattle, swine, etc., thus showing, we think, conclusively, that our Society manifests a willingness to encourage and reward those who take an interest in the rearing of choice stock. The raising of good horses and horned cattle we consider of incalculable benefit to the country.

The executive committee held several meetings prior to our fair and preparatory thereto. Our fair ground was fitted up in excellent

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order; great improvements were made, and everything got in readiness for the coming event.

The twenty-fifth annual exhibition of our Society took place on the ground occupied for the last seven years, on the Mohawk Flats, about midway between the villages of Herkimer and Mohawk.

Prior to the selection of the present grounds it was customary to change around, holding the fair alternately in the different villages bordering on the river, viz., Frankfort, Ilion, Mohawk, Herkimer and Little Falls. Finally, the present place was agreed upon, and, although giving some dissatisfaction at first, it is now conceded by all that it is the best point that could have been chosen in the county; and the permanent location is not only giving satisfaction to all, but it has done away with all strife and rivalry, and, in addition, saves quite an amount of expense to the Society. We have also been far more successful under this arrangement than we were in removing from place to place.

Our fair was held on the 17th, 18th and 19th of September. The weather was perfectly delightful; the roads in splendid condition, and our fair a complete success. The receipts were over $500 more than ever before realized by us at any fair since the organization of our Society.

The show of horses was spirited and the best ever before exhibited. The entries for competition were unusually large, embracing stallions, mares and colts, fancy matched and farm teams, single carriage horses, draught, saddle and trotting horses. The display of horses was highly creditable to our county.

Probably owing to the increase of premiums, the exhibition of horned cattle far excelled that of last year. Our farmers are evidently waking up to the importance of procuring and raising the best breeds and most valuable kind of stock; indeed, quite a rivalry in this respect seems springing up among our dairymen. Among those on exhibition were natives, Alderneys, Ayreshires, Devons and mixed.

The show of swine was good; that of sheep we cannot boast; in fact, there were but few of the latter on the ground.

Of poultry there was quite a variety, and the specimens fine, attracting considerable attention.

In regard to vegetables, the display was not equal to that of last year, at least, in quantity; that shown was of superior quality. Of potatoes there were over twenty different varieties; many of

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them of unusual size, and, judging from their appearance, of excellent quality.

Fruit was not largely exhibited, nevertheless there were a great many varieties.

Famous as Herkimer county is for cheese, and extensively as she is engaged in the dairy business, we might suppose that there would be a considerable rivalry and competition during our fair in this her staple product; but I regret to say such is not the case; very little cheese was exhibited. That present was of superior make and excellent quality. Why there is not more competition in this line, we cannot say; we certainly hold out good inducements in offering large premiums. There were several lots of choice butter.

Of grain there were some superior samples of winter wheat, rye, corn, oats, buckwheat, peas, timothy and clover-seed, shown.

Of farm implements there was a large display. The Remington Agricultural Works entered a large assortment, and among the articles were Woods' mowers, plows, cultivators, hay forks, hand hoes, &c., all of superior workmanship and finish, for which that establishment is justly celebrated. Among the other mechanical productions were hay tedders, revolving rakes, extension ladders, farm wagons, pleasure carriages, pumps, marble works, &c.

Floral hall and the ladies' department was one of the most attractive places on the ground, and was constantly thronged with a large concourse of people. The exhibition of domestic manufactures together with that of the fine arts, filled the shelves and tables almost to overflowing. The ladies of our county take a great interest in the welfare and success of our fair and society, and their assistance is of great service to us. Another great attraction to our hall was the large display of greenhouse plants and variety of cut flowers; of the former there was a beautiful collection of rare plants, and the latter were tastefully arranged.

In relation to the crops of our county for the present year, I would report as follows:

WHEAT.—Many years ago our farmers entirely abandoned the raising of this staple on account of its destruction by the insect. The high price of flour for the last four years has been the means of causing some of them to try the experiment of sowing sufficient for their own consumption, and have had remarkable success not only with spring but winter wheat. That grown this year yielded well and was of the best quality.

RYE.—More rye has been raised in this section for two or three

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years past than formerly, on account of the great demand for rye straw by our paper mills; the straw finding a ready market at good prices.

CORN.—This article, on the average, has been very good; but owing to the backward spring some of our farmers entirely neglected planting.

BUCKWHEAT—Very little sown and the yield generally poor.

OATS—Almost an entire failure.

HAY—The heaviest yield we have had for many years in the county and harvested in prime order.

HOPS—An almost complete destruction by insects.

POTATOES—About an average crop, very little rot. The early Goodrich's and Gleason's turned out remarkably well and are becoming great favorites.

Owing to the improvements made on our fair ground for the last two years, our expenses have been very large; but as our grounds are now in excellent order, we shall not for the future be subject to much expense arising from that source. On the whole, we are in a flourishing condition. Our financial condition is as follows:

Balance on hand, as per report, Jan. 12, 1867		$792 83
Cash received, State appropriation for 1866		140 00
Cash received for rents of stands during fair		322 00
Cash received for members' tickets		1,461 00
Cash received for single tickets		959 18
Cash received for seat tickets		68 50
Cash received for entrance money for trotting purse		100 50
Donation from A. M. Gray, for pump		5 00
Total amount of receipts from last fair		2,916 18
		$3,849 01
Cash paid for premiums	$1,460 00	
Cash paid for expenses	1,493 40	
		2,953 40
Balance on hand		$895 61

Officers for 1868: President, Ezekiel Spencer, Mohawk; Secretary, Eli Fox, Mohawk; Treasurer, J. Quackenbush, Herkimer.

Yours, respectfully,

J. QUACKENBUSH.

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JEFFERSON.

Amount on hand commencement year		$470 00
State appropriation		228 75
Memberships		2,159 40
Stands		75 00
		$2,933 15
Disbursements	$1,215 93	
Balance on hand	1,717 22	
		2,933 15

LEWIS.

Statement of the finances of our Society, January 14, 1868, and the disbursements for the year 1867:

C. G. RIGGS, TREASURER, IN ACCOUNT WITH LEWIS COUNTY AGRICULTURAL SOCIETY.

Dr.

By cash on hand, Jan. 14, 1867	$669 82
Received for membership	984 00
Received for sale of single tickets	220 04
Received from State	66 25
Received interest on balance, $669	46 10
	$1,986 21

Cr.

Premiums and expeses paid	1,265 02
Balance on hand, Jan. 14, 1868	$721 19

Officers of Lewis County Agricultural Society for the year 1868: Emmery Allen, President, West Turin; C. G. Riggs, Treasurer, Turin; F. R. Morse, Secretary, Lowville.

LIVINGSTON

GENESEO, *January* 4, 1868

To the Secretary of the New York State Agricultural Society.

We, the undersigned officers of the Livingston County Agricultural Society, respectfully submit the following report, as is required by section 9, chapter 425 of the Laws of 1855.

At the annual meeting of the Society, which was held on Tues-

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day, January 8th, 1867, the following officers for the ensuing year were duly elected, and at once entered upon the performance of their respective duties: Wm. H. Spencer, of York, President; Wm. A. Brodie, of Geneseo, Secretary; Kidder M. Scott, of Geneseo, Treasurer.

From the report of the treasurer, it appeared that there was in the treasury upwards of twelve hundred dollars, which was directed to be invested, and a committee appointed for that purpose.

At a meeting of the board of managers of the Society, held on Saturday, May 4th, 1867, it was resolved to have a horse fair on the 4th day of July; which was held. The annual cattle show and fair was held on the 26th and 27th of September.

The financial condition of the Society was never before as good as at this time, and, with careful and judicious management, I have no doubt this state of affairs will continue; but there is something besides financial prosperity to be looked for. If the agricultural interests of the county are not to be advanced through the agency of the society, then the objects of it are not accomplished. It is an undisputable fact, that there is not that interest among our agricultural people, that there once was in our annual fairs; and to ascertain the cause of such change, and to revive the drooping interest, will be the aim of the officers of this society at the annual meeting to be held on the 7th inst.

All of which is respectfully submitted.

W. A. BRODIE, *Secretary*

TREASURER'S REPORT.

The undersigned, Treasurer of the Livingston County Agricultural Society, does respectfully report:

That during the year ending on the 7th day of January, 1868, there has been received the sum of	$2,161 97
That there has been paid out during the year aforesaid	1,973 04
Being an excess of receipts	$188 93
The amount of balance at commencement of the year aforesaid was	1,246 63
There was in the treasury, on the 7th day of January, 1868, the sum of	$1,435 56

The receipts are made up of the following items:

Rent of grounds	$50 00
State appropriations	152 50
Annual members (366)	366 00
Life members (7)	70 00
Donations	230 00

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Exhibitions on grounds	124 50
Rent of stables	53 00
Sale of tickets	1,115 97
	$2,161 97

The expenditures, as hereinbefore stated, are made up of the following general items, viz:

Premiums paid, $958; salaries, $100	$1,058 00
Printing, $190.25; Secretary's expenses, $20.45	210 70
Internal revenue tax, $8.33; music, $149.50	151 83
Materials and repairs	47 51
Design for diploma, $100; forage, $7.90	117 90
Clerk hire, $37; police, &c., $344.10	381 10
	1,973 04
Balance on hand	$188 93

All which is respectfully submitted.

KIDDER M. SCOTT,
Treas. Liv. Co. Ag. Soc.

GENESEO *Jan.* 25, 1868.

MONROE.

ROCHESTER, N. Y., *March* 25, 1868.

B. P. JOHNSON, Esq., *Secretary New York State Agricultural Society:*

DEAR SIR—The undersigned have the honor to present to you the following report of the finances of the Monroe County Agricultural Society for the year ending December 31, 1867:

Cash on hand, Jan. 1st, 1867	$375 62
Amount received from State	242 00
Amount received from subscriptions	2,037 00
Total	$2,654 75

Contra— *Cr.*	
By cash paid for premiums at fair	$976 00
Paid expenses, and improvements of grounds	1,075 24
Total	$2,051 24
Cash on hand Jan. 1st, 1868	$603 51

The above report does not include moneys expended in permanent improvements to our grounds made during preparation for the National Horse Show held in the month of August, 1867. The amount so expended was in buildings to remain upon our grounds,

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which have become the property of this Society. The amount so expended was $1,200.

The following named persons were elected officers for 1867, viz: President, J. G, Klinck, Rochester; Secretary, M. D. Rowley, Rochester; Treasurer, Levi D. Mitchell, Pittsford.

Very truly yours,

JOHN G. KLINCK, *President*

M. D. ROWLEY, *Secretary*.

MONTGOMERY.

THE MONTGOMERY COUNTY AGRICULTURAL SOCIETY IN ACCOUNT WITH GEORGE C. SIMPSON, TREASURER.

Dr.

By receipts in the year 1867, as follows:

From pasturing grounds	$60 00
From life members	30 00
From stands and swing	52 50
From sale of tickets	1,256 43
From rents	75 00
From swing	15 00
From State	133 75
From loan office	1,550 00
	$3,172 68

Cr.

To payments as follows:

For labor, services, repairs to grounds, including new fencing	$770 54	
To paid mortgages	1,710 12	
To paid interest on loan mortgage	59 50	
To paid premiums of previous year	50 00	
To paid premiums of current year	541 06	
		3,131 22
Leaving a balance in hands of treasurer		$41 46

The Society own thirteen and one-half acres of Mohawk river flats, with buildings and fences thereon, valued at seven thousand dollars. There is one mortgage to the commissioner of loans for Montgomery on the same, amounting to two thousand four hundred dollars.

The Society have rented the lands and buildings for the year 1867, for one hundred and twenty-five dollars, with an agreement with lessee to have the grounds in readiness for the fair.

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The Society paid in premiums about two hundred dollars more than the previous year, and have discharged seven hundred and sixty dollars of the mortgage lien upon the same.

DATED *November* 9, 1867.

A. H. BURTCH, *Secretary*

NIAGARA.

LOCKPORT *January* 15, 1868.

Hon. B. P. JOHNSON:

DEAR SIR.—Our Society has held two fairs the past year. The first, for the exhibition of horses, sheep, &c., held May 4, was well attended, and more interest manifested in the exhibition and shearing of sheep than for several years.

The annual fair was held the last week of September. In consequence of the severe and continued drouth, many feared the exhibition would be less interesting and remunerative than usual, but in its features and results it proved to be the most successful. The show of sheep was one of the most interesting features of the fair. In addition to the representatives of fine and coarse wooled sheep of our own and adjoining counties; there were those from some of the best flocks of the celebrated merinos of Vermont; affording to those interested in wool growing an opportunity of examining a class of stock which is a chief source of agricultural wealth to an entire State. The exhibition of fruit, too, was such as to afford great satisfaction to the entire community as well as to those engaged in this branch of agriculture.

Notwithstanding the collection of agricultural statistics is one of the most important labors of our Society, and the efforts of the officers to obtain a full report of them, only seventy districts, out of about one hundred and seventy-five embraced in our county, have responded to those efforts. Such a meagre return will scarcely afford an approximation to the agricultural resources of our county.

The officers for the ensuing year are, Alex. Campbell, of Newfane, President; John E. Pound, Secretary; and E. Simmons, Treasurer. Lockport is the P. O. address of the two last named officers.

J. F. H. MILLER, *Secretary*.

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ONTARIO.

REED'S CORNERS, *February* 17, 1868

COL. B. P. JOHNSON, *Secretary New York State Agricultural Society:*

DEAR SIR.—The annual meeting of Ontario County Agricultural Society was held on the 29th day of January, at which the following officers were elected: President, Stephen A. Codding, Bristol Centre; Recording Secretary, J. B. Smith, Canandaigua; Corresponding Secretary, H. Stone, Reed's Corners; Treasurer, L. B. Gaylord, Canandaigua.

Receipts for 1867		$2,121 50
Payments, current expenses	$797 25	
Premiums	1,010 29	
Balance	313 96	
		2,121 50

Yours respectfully,

H. STONE, *Cor. Sec'y.*

ORANGE.

Receipts for the year	$1,952 84
Disbursements	2,238 50
Due the treasurer	$285 66

Officers for 1868: Ellis A. Post, President; Geo. W. Millspaugh, Secretary; Jason W. Corwin, Treasurer.

ELLIS A. POST, *President.*

GEO. W. GREENE, *Treasurer.*

ORLEANS.

ALBION, *December* 20, 1867.

The eleventh annual fair of the Orleans County Agricultural Society was held at Albion, September 13 and 14, 1867.

The receipts during the current year, exclusive of the State appropriation, are	$1,627 94
Add surplus on hand, Dec. 10, 1866	312 24
State appropriation	93 75
	$2,033 93

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The disbursements, since the annual meeting, Dec. 10, 1866, including the amount paid to apply on purchase of land, and including premiums paid, have been.....	$2,012 63
Leaving in the treasury a balance of.....	$20 30

The annual meeting of the Society was held on the 9th day of December, inst., and the following officers were elected: Hezekiah Bowen, of Ridgway, President; Samuel W. Smith, of Gaines, Secretary; Cyrus Farwell, of Albion, Treasurer. Also, Vice-Presidents and Directors,

SAMUEL W. SMITH, *Secretary.*

OSWEGO.

MEXICO, *January* 27, 1868.

The twelfth annual fair of the County Agricultural Society took place on the Society's grounds in this village, on Tuesday Wednesday and Thursday of last week. It was the greatest success in the history of the Society. The weather was delightfully pleasant and agreeable, and the attendance larger than on any previous year. There was a better display than usual in nearly every department of the exhibition. The enlarged grounds and buildings were very opportune, and contributed much to the comfort of the people. The receipts during the three days were $1,979.33, while the entire receipts of the Society during the year, including donations, pasturage, &c., will amount to about $2,200.

The annual winter meeting of the Society was held at the Empire House, in the village of Mexico, pursuant to adjournment, on the 2d day of January, 1868, when the following officers were elected: President, Morgan L. Marshall; Secretary, Henry L. Davis; Treasurer, L. H. Conklin.

H. L. DAVIS, *Secretary.*

OTSEGO.

COOPERSTOWN, ——, 1868.

The President, G. Pomeroy Keese, reports: The annual fair of the Society for 1867 was held on the first three days of October. There was a pleasant gathering of the farmers from this and the

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adjoining counties. The weather was very propitious, and the exhibition, in most departments, very satisfactory. We note particularly a fine display of horses; fair exhibition of sheep; meagre turn out of cattle; a large, varied and interesting display in the domestic hall; an unusually full exhibition of vegetables, together with a select and attractive show of flowers.

Receipts are as follows:

1867, Jan. 1st, by cash in the treasury		$704 28
Receipts during the year		2,939 86
		$3,644 14
Disbursements:		
To expenses	$1,120 98	
Premiums paid	1,056 00	
Invested in bonds	524 05	
Cash on hand	943 11	
		3,644 14

Officers for 1868: President, Henry Roseboom, of Roseboom; Secretary, H. M. Hooker, of Cooperstown; Treasurer, B. F. Murdock, of Cooperstown.

PUTNAM.

To the Secretary of the New York State Agricultural Society:

The annual fair, held on the Society's grounds at Carmel, September 18, 19 and 20, was a decided success.

The receipts for life memberships and admissions were $1,991.49, being largely in advance of any previous year.

The new fair building, erected at a cost of about $10,000, was fully completed and occupied for the purposes of the fair.

An excellent address was delivered by Hon. Horace Greeley.

The following exhibit shows the financial condition of the Society:

Balance on hand, Jan. 1, 1867	$929 53
U. S. 5-20 bonds	1,070 00
Received from State treasurer	47 50
Life membership	400 00
Admission tickets	1,591 49
Rent of grounds	23 00
Balance from building fund	175 00
Sale of tent	150 00
Subscription upon building	50 00
	$4,436 52

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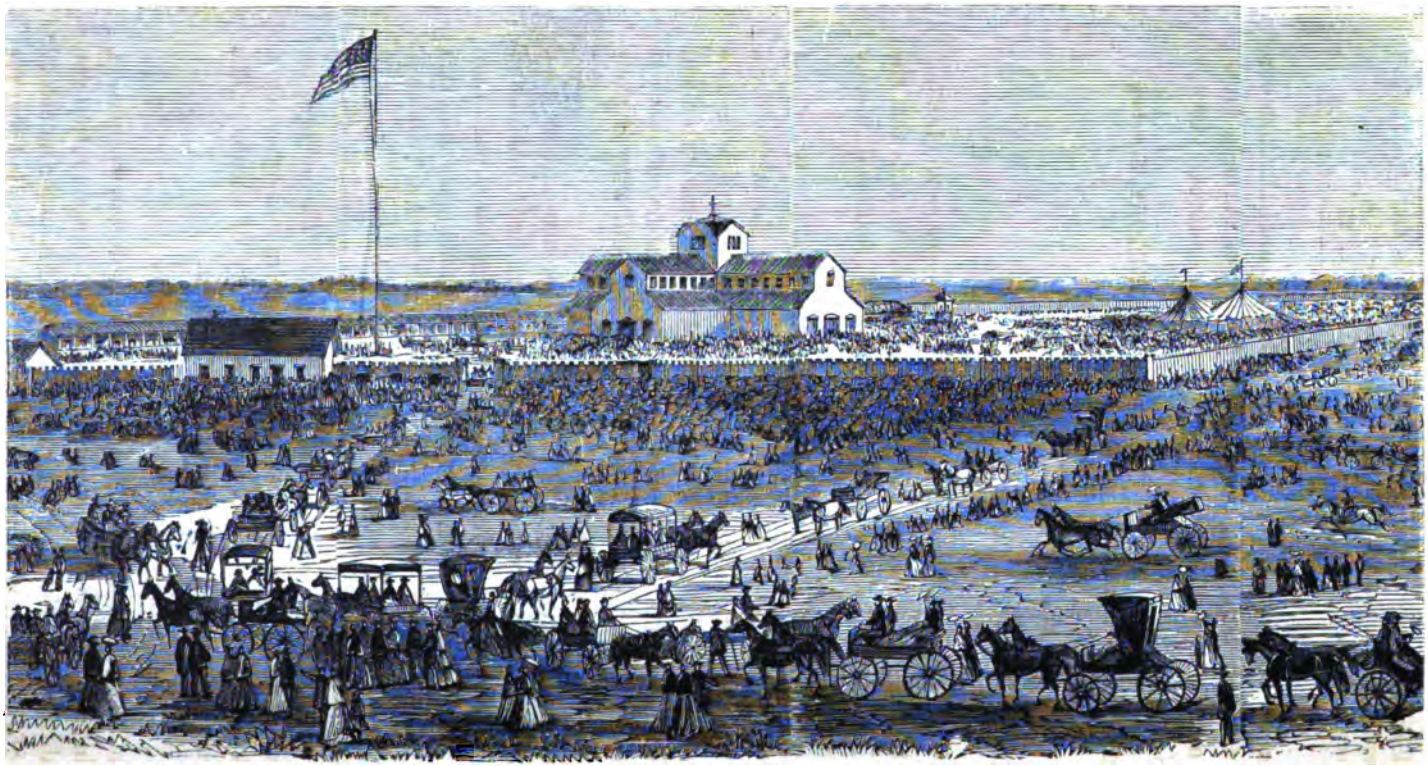

QUEENS COUNTY FAIR GROUNDS, NEAR MINEOLA, LONG ISLAND.

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Total expenditures, including $1,223.49 paid towards the erection of fair building.....	$4,344 30	
Balance in treasury, Jan. 1, 1868.....	92 22	
		4,436 52

Officers of the Society for 1868: President, Daniel D. Chamberlain, of Carmel; Secretary, George W. Gregory, of Carmel; Treasurer, Ambrose Ryder, of Carmel. Secretary's address—Croton Falls, N. Y.

GEORGE W. GREGORY, *Secretary.*

DATED *January* 31, 1868.

QUEENS

HEMPSTEAD, *November* 25, 1867.

In submitting the annual report, it is gratifying to note that the interest manifested in the prosperity of our Agricultural Society continues unabated.

At the return of spring our labors recommenced. We found some of the buildings had been occupied during the winter by a large number of colored tenants; the long row of carriage houses at the north end of the grounds having furnished comfortable and safe quarters for hundreds of crows, who, on our first visit, flew out from their shelter, greeting us with "caw caw," and winged their way to more retired habitations.

On examining the buildings, all was found secure and in good order, yet the severe storms of winter and spring had considerably damaged the fences and hitching-posts adjoining; these were temporarily secured until we could procure lumber for braces and extra posts. Laborers were engaged, and on the 12th of April we commenced operations for planting trees. The deciduous trees consist of various kinds of maple and ash, larch, elm, magnolia, linden, walnut, rosemary and new American willows, &c, The evergreens, of Norway spruce, white spruce, Scotch, Austrian and other pines, hemlock, juniper, arbor-vitæ, &c., and a variety of shrubs. The whole cost of planting trees amounts to $116.22.

THE HORTICULTURAL EXHIBITION.

At the last annual meeting of the Society, a resolution was passed, requesting the board of managers to take into consideration the practicability of holding an horticultural exhibition in the month of June, 1867, and at a meeting held April 13, it was decided that the

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exhibition should be held on June 21, the secretary being instructed to prepare a list of premiums, amounting to $100, to be awarded on the occasion. By the unexpected liberality of several friends, $70 were subscribed for special premiums, thus enabling us to include many articles not at first contemplated. This was to be the first purely horticultural show in which the Society had been engaged, and we felt great encouragement by the liberal donations of our friends; in addition to which, many of our lady friends came forward and offered to hold a festival on the same day, procure supplies of refreshments, &c., and donate the profits to the Society. They succeeded beyond our most sanguine expectations, the whole resulting in a success both pleasing and flattering to its originators. The attendance at the horticultural show was numerous, partaking more of the character of a family reunion, and everybody seemed pleased. The festival was carried on with great spirit and most excellent humor, the beauty and *elite* of the county being engaged as managers and waiters. The net proceeds of the festival were $846.75. Forty premiums were awarded, including cash of $133.

DEATH OF EX-GOV. JOHN A. KING, EX-PRESIDENT OF THE SOCIETY.

The Society, in the month of July, was called upon to mourn the loss of one who had been most eminent in the services of the Society, having been president from 1848 to 1855, and since that time one of its staunchest friends. The board was called together on the 11th of July to attend the funeral. The president of the Society was unable to attend, and sent the following note:

"ROSLYN, *July* 10, 1867.

"*To the Board of Managers of the Queens County Agricultural Society:*

"GENTLEMEN—Inasmuch as it has pleased Divine Providence to remove from among us our venerated friend and ever trusty counsellor, Hon. John A. King, it is eminently proper that, while uniting in the universal tribute of respect paid to departed worth, we should especially make a public expression of our grief at the great bereavement that has thus suddenly fallen upon the Agricultural Society of Queens county, with which the deceased was so long, so efficiently and so pleasantly associated.

"From its establishment an active member; for many years its chief executive officer, and always its most sterling counsellor and steadfast friend; at its public meetings his genial presence was ever

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welcome and his absence ever a subject of regret; and now his final departure from our associations and councils leaves a void, which we can scarcely expect to see filled. As the years shall roll by, and the recollections of that truly *glorious old man* shall come pouring back upon us, may they continue to become brighter and brighter souvenirs of that high sense of honor, acute judgment, genial kindness, sterling integrity and exalted patriotism which were so peculiarly characteristic of him we mourn, and of whom it may be truly said

"'His latest thought, his latest breath,
To Freedom's duty giving,
With failing tongue and trembling hand
The dying blest the living.'

"I regret that, from any cause, I could not be with you to-day in paying the last tribute of heartfelt sympathy to one whose many excellencies endeared him most to them who knew him best, but ill health admonishes me to forego that melancholy duty.

"I remain, truly yours, &c.,

"SAMUEL T. TABER,

"*President Queens County Agricultural Society.*"

After the secretary read the above, Samuel M. Titus was called to the chair.

The secretary then presented to the board the following minute on the death of Ex-Governor John A. King, Ex-President of the Society:

"The board of managers have heard with feelings of deep emotion the death of Ex-Gov. John A. King, and sincerely mourn the loss of one, a long tried and true friend of the Queens County Agricultural Society.

"For seven years he was a faithful President of the Society. In him the members had unbounded confidence. His place is suddenly vacant, and no more shall we hear his cheerful, ready voice in his trusted counsels. In our darkest days he was an unfailing friend, and no man rejoiced more when the Society became permanent and prosperous.

"Our memories will always bear the impress of his forcible convictions in maintaining the honor and interests of the Society.

"We mourn the loss of a father, one whom all men delighted to honor, whose actions were without fear and without offence.

"We desire to record our humble tribute to his worth, hoping

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his example may prove an incentive to others to follow his noble course.

"To his bereaved family and friends we desire to express sincere condolence, and as an expression of the sentiments known to exist throughout the Society, the board will attend the obsequies as a testimonial of regard to the virtues of our deceased friend."

On motion, it was unanimously

Resolved, That the foregoing minute be approved and entered on the records of the Society, and a copy of the same be published and forwarded to the family of the deceased by the Secretary.

EPIDEMIC CEREBRO SPINAL MENINGITIS.

In the month of May a fatal disease broke out among the horses of Mr. R. E. Thorne, of Great Neck, and in a very short time he lost eight valuable animals. Several sporadic cases occurred at other places. In August the same disease assumed an epidemic form among the horses of Mr. Charles H. Jones, of Cold Spring Harbor. A number of newspapers published in various parts of the State came out with statements that the Rinderpest had appeared among Mr. Jones' stock, which induced us immediately to write for particulars, and we received the following report:

"NEW YORK COLLEGE OF VETERINARY SURGEONS,
"NEW YORK, *September* 9, 1867.

"JOHN HAROLD, Esq.:

"DEAR SIR.—Please find enclosed an extract of the report made of the Epidemic Cerebro Spinal Meningitis, which broke out lately on the farm of Mr. Charles H. Jones, of Cold Spring. I hope this will prove satisfactory to the Queens County Agricultural Society.

"Most truly yours,

"A. LIAUTARD, M. D. V. S

"On the 17th day of August I was notified of the fact that Mr. Charles H. Jones of Cold Spring, L. I., had in the space of three days lost five horses and two mules, and that a black mare had also died on the same morning, of a disease which seemed to be unknown and new. I went, on the morning, to Mr. Jones' farm, and found a black mare and a sorrel one affected, a gray horse in a dying condition, five other horses (two stallions, two bay geldings and a bay mare) which had been exposed but still free from disease.

"Without difficulty, after examination of the three cases present, I recognized the Cerebro Spinal Meningitis of an epidemic character.

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"The symptoms presented by the patients already dead I cannot to a certainty depend upon. The most prevailing one being a difficulty of motion—staggering and stumbling during locomotion, with loss of power of the tail—these being soon followed by paralysis, terminating in death. Of the sick ones that I saw, the first trouble was a loss of the power of deglutition of liquids; indeed, the black mare, which presented that symptom best marked, would keep her head in the pail of water a length of time, endeavoring to swallow, but unable to do so. This is soon followed by a difficulty of deglutition of solids—the food is taken up, masticated, and stored up between the cheeks and the teeth, but cannot be swallowed. Sometimes, however, these are overlooked, and loss of power of the extremities seems to be the second mode of appearance of the disease.

"Abundance of saliva was running from the mouth, from inability to swallow it. The hand introduced into the back part of the mouth, received the sensation of going into a large pouch, all parts being relaxed. Sphincters relaxed. Bowels generally costive. No great change seems to have taken place in the respiratory or circulatory system. This condition of things lasts for a time which varies from a few hours to several days. This black mare stood eleven days before other complications appeared. These are: a general dull condition, and soon the animal loses power of his hind extremities, lays down, and rises no more. In the patients that I had, from the moment they laid down they were taken with convulsive struggles, followed by comatose stupor. The loss of power, the loss of sensation, can be easily followed from backwards forward, until death, which will take place from a very short time to twenty-four or thirty-six hours, in a state of coma. The respiration has then become excited, the circulation being quickened. but the pulse soft. I have not, in any of the patients, noticed a difference in the condition of the pupil.

"The bay mare and one of the bay horses were afterwards taken, and all these symptoms followed each other with an equal rapidity.

"*Post-mortem Examination.*—On opening the cranial cavity, an abundant collection of bloody serosity is found in the sac of the arachnoid, the pia mater is very much injected, and deposits of plastic lymph are found here and there on the length of the whole cord, but especially at the anterior cervical, lumbar regions, and at the base of the brain. The mucous membrane of the larynx slightly injected; the lung corresponding to the side the animal was lying

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on at the time of death is congested, but this has no particular connection with the disease. Heart and abdominal organs are healthy.

"*Duration.*—The duration of the disease is from a few hours to several days. At Mr. Jones' farm, a bay horse, apparently well to-day, was dead the next. Prof. Large reports a case which lasted but eighteen hours, One of the animals I saw, stood up eleven days and died the twelfth.

"*Prognosis.*—This is one of the most fatal diseases of the horse. In my cases, in those which are recorded, but few patients recovered, and those are only in these animals where the first symptoms—viz: the imposibility of swallowing liquids—existed.

"*Treatment.*—A satisfactory mode of treatment is a difficult question to resolve. We are brought in contact with a serious affection, with a disease whose career is very rapid, whose lesion and termination will not allow of hesitation and loss of time.

"The inflammation attacks one of the most important systems of the body, and all efforts must be brought upon it to relieve it as soon as possible. Blood-letting is not indicated by the condition of the pulse. Cathartics are the depletive agents to be resorted to, to be followed at once by some sedative agents (aconite and belladonna) whose action is principally directed to nervous systems.

"Counter-irritation, external stimulants to produce revulsive action are to be applied along the spine, the throat, the poll of the head, and renew until relief is obtained. As an extra precaution, it is prudent to remove all animals from the seat of the locality. This treatment was followed at Mr. Jones', on the attacked animals; those not diseased, as a preventive, received the cathartics and same sedative. The following was the result obtained: the sorrel mare recovered; two stallions and a bay gelding escaped the disease.

"Prof. Large, in his report to the president of the faculty of the N. Y. C. of V. S., May 2d, says: 'Can this disease be prevented from spreading among the other horses on the farm? was a question that arose to my mind the first visit I made. There were twelve horses and colts still remaining; three of these, as an extra precaution, I sent some little distance away; of the others, some were kept in the stable where the first case occurred, others were running in the field where two cases also had occurred; but all the animals, whether at home or abroad, with the exception of an old blind mare, that was considered useless, were placed under the same treatment (cathartic and sedative). It was begun on Friday, May 3, and continued, to some extent, to May 18, with the follow-

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ing result: the old blind mare died on the 12th, being attacked on the 9th; all the other horses escaped the disease.'

"*Causation.*—When disease assumes an epidemic or endemic character, there is a special cause in operation. What it is we do not know. There may possibly be co-operating causes, which may assist the special unknown cause in producing the disease; for example, the disease usually makes its appearance in the spring of the year, when the weather is changeable in temperature, and frequently wet; these may, perhaps, have something to do with its development. Stable management has but little, as it attacks those that are well cared for, and those that are not—attacks in the field and in the stable; in fact, neither age, sex, condition, nor the mode of living, seems to give exemption from an attack, nor to modify the symptoms when it occurs.

"*Contagion—Infection.*—Is this disease contagious or infectious? I do not believe it is either one or the other. When this disease breaks out among animals in a certain location, it may be fatal to many or all; but that is no proof of contagion or infection, for they are all alike exposed to the local existing cause, whatever it may be. A healthy animal, by being placed in an affected district, and allowed to remain, may be affected, but that is no proof, for the same reason above stated. The only proof we can have, is of an animal affected carrying the disease from the locality where it was contracted and communicating it to healthy animals. In answer to this proposition, I will say that two years ago an animal suffering from this disease was removed to a stable among a number of horses. The case was fatal to the patient, but the disease was not communicated to any others. I have a second case circumstanced the same, but the patient was seen very early, and recovered.

"*Remarks.*—This is by no means a new disease; some eighteen or twenty years ago it appeared on Long Island, and assumed the form of an epidemic, which killed thousands of horses. Now and then a few sporadic cases showed themselves in cities, but we find that in agricultural districts it takes the epidemic form. In May last I visited, with my friend, Prof. Large, an outbreak which took place at Great Neck, and where seven horses died in five days. Mr. Jones has lost nine horses and two mules, and I firmly believe, had the preventive treatment been put in practice at once, more horses would have been saved.

"A. LIAUTARD, M. D. V. S.,
"*Prof. of Comparative Anatomy and Operative*
"*Surgery to the N. Y. C. V. S.*

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"GREAT NECK, *October* 29, 1867.

"JOHN HAROLD, Esq., *Sec'y Queens Co. Agricultural Society:*

"DEAR SIR—Yours of the 24th inst., asking the particulars of the disease by which I lost my horses, is received.

"I will give you all the information I can, also the *post mortem* made by Dr. Hoag, a physician of standing at Manhasset.

"The first horse was taken sick, or, more properly speaking, discovered to be sick, on Monday morning, April 29th. He was harnessed to go to work; on the way to the field he fell; I was called, found him down; from his actions, thought it a case of staggers; treated him accordingly. Before night I discovered his inability to swallow; applied mustard freely to his throat; no relief. Wednesday morning the second one, a breeding mare, was taken. I then saw I had something more than staggers or sore throat to contend with. The first horse died in the afternoon.

"On Thursday morning three were found affected—a mare in foal, a work horse, and a young horse (one of a team I had sold, about ready to be delivered to the purchaser).

"I now found that I had something to contend with requiring professional knowledge. I went to Brooklyn and brought up Dr. Large, a professor in the Veterinary College of New York. He pronounced the disease, from my description, to be meningitis. On his arrival at my place, he found my description was correct, and the disease was cerebro spinal meningitis, in full force.

"The breeding mare, taken Thursday morning, died during the night.

"On Friday morning, two young horses, four and five years old, were taken. The second one, taken Wednesday, died this evening. Dr. Large returned to Brooklyn. On Saturday morning he came again, bringing with him Dr. Liautard, also a professor in the college. Their services were directed more to the well horses than to the sick, they being beyond help.

"Saturday evening, one of the young horses, taken Friday, died; Sunday, the other died; on Monday, the two taken on Thursday died.

"The first, taken April 29, died May 1; the second, taken May 1, died May 3; the third, taken May 2, died May 2; the fourth, taken May 2, died May 5; the fifth, taken May 2, died May 6; the sixth, taken May 3, died May 4; the seventh, taken May 3, died May 6.

"The one living the shortest time was a mare in foal, her time

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nearly up; the fifth one, living the longest, was the oldest horse on the farm, and lowest in condition.

"These cases were not all affected in the same manner, but one symptom was found in all—inability to swallow. Some were partially paralyzed in the fore legs, others in the hind legs; in others, the paralysis affected the whole body; while in one, the oldest, it only affected his swallowing. This horse stood up from the time he was taken, the second, until the fifth.

"The first symptom discovered in all was the inability to swallow; although, to all appearance, the horse would eat and drink, yet close observation would show that not a particle went down the throat.

"On Monday, May 6, one week from the first case, seven horses were dead. We opened one, and I herewith give you the report of Dr. Hoag, as made out by him at my request:

"*Post-mortem* examination of R. E. Thorne's horse, supposed to have died of cerebro spinal meningitis:

"On dissection, the viscera exhibited very little worthy of observation.

"Left lung normal and healthy. Right lung very considerably congested.

"Left cavity of heart almost entirely empty. Right side nearly filled with a large yellow colored fibrous coagula.

"Liver, kidneys, stomach and bowels apparently healthy. In the cellular tissue of the neck was found a very abundant effusion of lymph, of a yellowish hue.

"On displaying the spinal cavity, the cord was found in a state of complete softening. There was no adhesion of the membrane, but along the greater part of the cavity was found a layer of lymph, perhaps an eighth of an inch thick, which in some places completely enveloped the cord.

"The spinal membrane had a pale appearance.

"The cavity of the cranium contained none of the morbid secretion. The brain itself exhibited a very marked softening.

"Dr. Large was not present at the examination, but we found exactly what he said we would find. The course of the disease and the examination prove to me where, in case of any sickness among my stock, I can find competent assistance, with as much confidence as I would in sending for a family physician.

"I now began to hope that the disease was arrested, and that I had nothing more to fear; but on Thursday, the 9th of May, a mare

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was taken. She died on the 14th. This was the last, making eight in all. Since then have had nothing of the disease.

"I am afraid I have made my communication too long, but have endeavored to make it as brief as possible and yet get in all the particulars. Very respectfully,

"R. E. THORNE."

THE TWENTY-SIXTH ANNUAL EXHIBITION

Was held on the Society's grounds on the 25th, 26th and 27th of September. The attendance during the three days was very large, the best order prevailed, the police arrangements were very well managed, and no pocket picking or gambling was heard of on the grounds. The number of manufactured goods from New York and Rrooklyn were less than last year, owing to the fact that the Long Island railroad failed to comply with their pledged engagements in passing articles free, after entry, the steamer Arrowsmith being the only reliable conveyance. The manufactured articles from the county were in excess of last year, and of a very superior quality.

Cattle.—Fifty-three premiums awarded.

Horses.—Fifty-seven premiums awarded.

Poultry.—Twenty-eight premiums awarded.

Domestic Department.—This class included almost everything in the way of table necessities and luxuries. Thirty premiums were awarded.

Grain.—The show of grain was superior to last year, and the specimens fine. Twenty-three premiums were awarded.

Vegetables and Roots.—The display was superior in quality to last year. The show of potatoes remarkably fine, especially of the various Goodrich varieties, which seem to suit our soil well.

Implements, Carriages, &c.—From causes noted at the commencement of the fair report, the number of entries in this class was quite limited; yet, there were many good articles.

Fruit.—As usual at this county fair, the show of fruit was good, especially hot-house grapes. Thirty-seven premiums were awarded for fruit.

Flowers.—Twenty-three premiums. The display was very fine, many ladies being competitors. It is gratifying to record an increasing taste for the cultivation of flowers; few things tend more to beautify our dwellings and refine the mind. Quite a large business is growing up in the cities of New York and Brooklyn, in furnishing cheap bouquets, say from ten to twenty cents each.

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and it is becoming customary for a person going home from market to carry one of these bright jewels. We have been informed that during the past year the supply has been inadequate. A market may thus be open to our ladies to employ their spare time pleasantly and replenish their purses. Our farmers and gardeners go almost daily to the city, and could carry supplies to meet this growing demand. Light, long boxes, with trays to hold a daily supply of flowers, could be cheaply constructed, and would, no doubt, meet a ready sale.

Needle Work.—This class embraced almost every variety, from the child's mittens to elegant embroidered robes; from the work of the child to the aged great-grandmothers. The varieties were far too numerous to mention. About ninety promiums were given.

The officers and town committees who united their best services in the welfare of the Society, deserve our grateful thanks, but especially to the ladies are our thanks due, for their kind and valuable services in superintending the festival, from the receipts of which we have been enabled to pay off five hundred dollars of the debt, together with the interest due.

We would not pass by the efficient services of the general and other superintendents, who exerted themselves in maintaining such excellent order during the exhibition.

We congratulate the Society on its progress at the close of another successful year, and with feelings of pardonable pride state that eighteen years ago, when the undersigned was first appointed secretary and treasurer, the fair was held on a small lot at the corner of Greenwich and Prospect streets, in the village of Hempstead, not fenced in. The tent was fifty feet in diameter, the entrance fee to which was one shilling; only one plow was exhibited; the amount received on that occasion for "permanent and annual members, was $116." How steadily have we progressed since that time! Now, our receipts from all sources amount to $10,700, and our grounds are spoken of with pleasure, as a credit to the good old county of Queens.

THE WINTER MEETING

Was held in the exhibition hall on Monday, November 25, 1867, and was largely attended.

James F. Hegeman, of Searingtown, made a statement of a crop of corn yielding sixty-three bushels to the acre, making a profit of

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$61.90; but not being accompanied with the required affidavits, a premium could not be awarded.

The show of grain was much better than for several years past.

THE ANNUAL MEETING

Was held at the same place, at one o'clock in the afternoon of the same day. The meeting was opened by the delivery of the following

Address,

BY S. T. TABER, PRESIDENT.

To the Members of the Queens County Agricultural Society:

At the close of a two years' campaign in the service of the Queens County Agricultural Society—two not the least eventful years in its history—it will not, perhaps, be amiss for me to trespass upon your attention with a few remarks in regard to its affairs.

The doubtful and perilous experiment of a change from a transient system to a permanent location, having been thus far succesfully tested, has not been without its toils, its anxieties, its annoyances and its disappointments—mingled, indeed, with many gratifying incidents of generous and noble spirited enterprise that stimulated the energies and relieved the toil of those upon whom the burthen of the labor has devolved.

But, in our exultation, we must not forget that we have only commenced to lay the foundation upon which is yet to be built a structure whose usefulness and influence will be continually increasing with experience and a proper management of its affairs. Creditable as its former record is, yet every year develops deficiencies and opportunities for improvement. Agricultural societies in this country are yet in their infancy, and indeed the people are not yet prepared to fully appreciate their high mission, or to comply with the laborious duties which will be required to develop their highest utility. It must be confessed that, under the present imperfect system, or rather want of system, of awards, but very little satisfaction is or can be given, and but comparatively little good can result from it. Hence it is that we so often hear that uncomplimentary expression "humbug" in connection with the mention of our fairs. Even at this day, when agricultural exhibitions have become as fixed facts—as certain events as New Year and Fourth of July—there are but comparatively few who appreciate their real legitimate purposes, or at least there seems to be but few who realize that the award of prizes is but one of the means to

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the accomplishment of an end, and not the end itself. How infinitely small and unimportant an inducement to contribute to the fair is the paltry award of premiums when compared with the mighty results which must flow from the gathering together of the great mass of intellect which guides and controls the productive industry of the country—the bringing together of the people in council, where they can compare views and experiences with the practical results of those experiences spread out before them; where not only the few men who may be selected as judges can compare and judge of their merits, but where everybody can read, and see, and judge for himself, and acquire a mass of information nowhere else to be acquired. To those viewing it in this light, the award of premiums becomes a trifle, but little more than the expressed judgment of three men, whose judgment, like that of all human beings, is liable to be warped or biased by previously acquired interests or prejudices, and from which it is the high prerogative of every one to dissent. What, then, it is asked, would you abolish the system of awards and offer no prizes? Would you offer nothing to stimulate competition in the different classes? Would you throw the grounds open and invite every one to overwhelm us with a flood of trash, to the utter disgust and discouragement of those who are conscious of having made contributions of superior merit? If you will not permit persons of good judgment to decide upon the relative merits of the articles on exhibition, how are the inexperienced to know which to admire, which to emulate? And here is where the greatest responsibilities, and one of the most difficult and delicate duties of the managers of a society like ours, comes in—the judicious award of premiums and the securing of proper and competent persons to award them. That awards should be made, if competent persons can be found willing to faithfully discharge that duty, no one can doubt. But it is yet doubtful whether the mischief resulting from the improper discharge of judges' duties does not preponderate; a fact which cannot be too strongly impressed upon the members of the board of managers, nor any less so upon the minds of those who are selected as judges, for they will then begin to appreciate the embarrassments which beset the managers when those who have been selected on account of their peculiar fitness decline to act, and new judges have to be selected on the spur of the occasion—a duty that can seldom be satisfactorily performed. Those who have had no experience in this matter can have little concep-

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tion of the difficulty of finding competent judges for any of the numerous classes to which premiums are to be awarded. It would seem at first thought that, among so many thrifty farmers as we have in Queens county, there could be no trouble in finding enough who would be willing and capable of deciding upon the merits of the different classes of horses, cattle, sheep, swine, or poultry; and yet without any disparagement to their character for general intelligence or integrity, I believe that it would be difficult to find six men competent to act as judges upon all the different classes of stock above named out of the hundreds who raise, use and deal in every one of those classes. Of course, it is not required of a judge to be competent in any other than the class for which he is appointed, and therefore it is of no consequence whether he understands the true points of excellence in the others or not. Very well, then, I will make another declaration, which is simply an opinion resulting from my limited experience in the matter, and you may take it for what it is worth, and that is this, that there are not six men in Queens county *competent* and *willing* faithfully to discharge the duties of a judge *in all the subdivisions of any one of the above classes*, and in this view I believe I shall be confirmed by those whose duty has required them to select the incumbents of those positions. But in this regard we do not stand alone in this great State, as those can testify who have had the committees to select for the State Society, so that we need not be discouraged, although it is ample cause for regret that there should be such an utter want of thorough knowledge in the details of the employment in which we are engaged.

Now the question will very naturally arise, if this be really the case, how is it that judges have been found, year after year, who not only discharge those duties, but do so to the general satisfaction? Has the Society been deceiving exhibitors and the public by awarding their premiums at random, and not according to the honest judgment of competent men? The answer is emphatically, No. The Society have been generally successful in securing the services of judges who were both competent and honest, and usually quite equal to the duties assigned them, for the reason that it seldom occurs that all the different breeds are represented in the various classes at our exhibitions, and that judges have seldom been required to act upon more than one or two subdivisions of each class; but it cannot be denied that there have been times when it has been impossible to secure the services of competent judges.

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These are facts not particularly flattering to our pride, but facts for all that, to which we must not close our eyes—facts which it has been part of the mission of our Society to disclose, and which when once fully appreciated it will be the mission of our Society to improve. The greatest obstacle in the way of all improvement is the imperfect knowledge of our own deficiencies. When we know how little we do know, then we are ready to begin to learn. It is the mission of our Society to educate judges as well as exhibitors and spectators; and, as I said before, we are but just laying the foundation of a great school to which we must all come to learn and teach each other, and upon those who are entrusted with its management there is a fearful responsibility, for whether its teachings be for good or whether they be for evil, rests mainly with them. In great collections of people there is always more or less tendency to mischief; and as agricultural fairs have become inevitable occurrences once a year, it is the duty of every good citizen to endeavor to make them the accessories of improvement and instruction, rather than the engines of mischief and of evil. One or the other they surely will be, for with them there is no standstill or retrograde motion, but it is all positively onward. Experience and practice in making awards, as in everything else, are matters of very great importance, and a proper and careful discharge of those duties affords the most certain and practical means of instruction. It is a comparatively easy matter for persons tolerably familiar with the general appearance of horses, cattle, sheep or swine to pronounce a verdict upon their qualities and appearance as a whole, while there are comparatively few who would feel competent and be willing to give judgment upon an animal *point by point according to an established scale*, and which is the only really exact method of judging of its merits—a method which, while it tests the competency of judges as well as the excellence of cattle, also instructs the judges in their duties, and shows to exhibitors the reasons why, in the opinion of the judges, their stock has been deemed superior or inferior to others on exhibition. A method which, while it requires more patient labor than judges are usually disposed to be subject to, is not after all so formidable a task as to the uninitiated it seems—but which perhaps, in the present slipshod age, is sufficiently so to deter most men from accepting the situation or undertaking to discharge the duty, but which a few years will render both practicable and necessary.

As the Society increases in age and in permanence, it should

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establish for itself higher standards of excellence and more thorough systems of actions which shall sift out the chaff and the shoddy, and place the stamp of its approval only upon objects of sterling merit. It cannot afford to make its diploma, which should be awarded only to objects of importance and of the highest merit, a mere bauble to be bestowed upon trifles, and after a little while thrown among waste papers.

If the premiums for agricultural and mechanical implements are only awarded after a thorough practical trial by competent judges, then they become reliable criteria of worth upon which those who have no opportunity for making trials before purchasing, can depend; if, however, the premiums are awarded without any satisfactory tests having been made, the Society thus becomes instrumental in giving false credits to be imposed upon the public, and the authority of its decisions dwindles into contempt. I would therefore recommend that in all such cases the simple opinion of the judges as to the *apparent* merits of those articles be expressed, but no premiums be awarded. A careful revision of the premium list is every year made, and it would greatly aid the managers should members and exhibitors suggest to them changes in the departments to which their own attention has been especially drawn.

Every year reveals defects in the mangement and develops necessities for change. The very full report of our secretary will show you in detail the operations of the Society for the past year, and its financial condition, which, considering all the improvements that have been made, is in the highest degree satisfactory, while it also shows the exceeding importance of closing up some of the avenues of imposition to which the Society is exposed. The system of issuing to members family tickets has led to much difficulty and abuse, and I would recommend the issuing a fixed number of passes to each member, placing all on an equality, and diminishing the temptation to an unnatural increase in some families on the approach of the county fair.

Among the most gratifying features of our late fair was its freedom from side shows, claptrap gambling, thieving and drunkenness. Never before had such numbers thronged to our fair, and never so cheerfully quiet, nor so entirely free from rowdyism and dissipation.

That we are greatly indebted to our police arrangements and to the prompt and energetic action of our local authorities for this result cannot be denied, but the exclusion of exciting and irrele-

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vant exhibitions left little inducement for the attendance of that element of society from which disturbances and rowdyism usually emanate; and it is only by the exercise of the utmost watchfulness, and a persistent resistance to outside pressure, that the managers of the Society can, with the aid and encouragement of the members, prevent a prostitution of its influences to mischievous purposes. The desire to get out of debt, and the temptation to increase the revenues, are constantly urged as excuses for making the show grounds a rendezvous for gambling, and making horse racing the chief feature of the annual fairs. The award of premiums, whether special or otherwise, for *speed alone* throws the doors wide open to horse racing in all its exciting, mischievous and obnoxious features, and in no degree contributes to the beneficent purposes of the Society; and although it may tend to draw crowds to the race, it were far better the Society should go down, and the grounds revert to their original desolation, than that the one should become an instrument to give the sanction of respectability to what, upon the Fashion and Union course, are denounced as vices, or that the other should become the school where our youth are taught the incipient lessons of the track. When, indeed, it becomes necessary to keep up the interest in our county fairs by a resort to such stimulants, then it were better they were abandoned. That the improvement of the horse, in all his various classes, is a legitimate, a necessary, and an attractive duty of the Society, all will admit; that speed is one of the elements of value, is also true, but it is manifestly improper for an agricultural society to make *speed alone* the criterion of merit. Neither is it necessary to have contested trials in order to show the style and action of our horses. But we are told that the horse race is the most attractive feature of the fair, which is not denied, and for the very reason that it is so attractive and utterly demoralizing as to overwhelm all interest in the other departments of the fair, it requires the greatest care to prevent it from becoming the only object of interest.

The first summer exhibition of fruits and flowers was much better patronized by visitors than exhibitors; although the articles shown were mostly of great excellence, yet there was a deficiency in the number of entries, and a lack of interest to contribute, arising, probably, from its being a new field of enterprise, but really one in which this county ought especially to excel; and I have no doubt that future exhibitions will show a greatly increased

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interest in this department, and would earnestly recommend that they be continued.

The importance of horticultural improvement is constantly pressing upon us, as the demands of the cities of New York and Brooklyn increase, and as the influx of the coarser products of the farm from the more remote regions render their production here less profitable, and the constantly increasing value of our lands require the production upon them of such articles as cannot be profitably transported from a great distance. Of these, the tender fruits, vegetables and milk probably will constitute the chief staples upon which we must mainly depend for profitable farming, and it becomes the duty of our Society to extend especially to them its fostering care.

The proposition made to change the wording of the Constitution so as to admit to membership non-residents of the county will come before you for your action—a subject of much importance, as by it you will determine how far you will extend the privileges of the Society. It would seem that there is great propriety in opening our doors to our neighbors and inviting them to friendly competition, by which means they will obtain all the substantial benefits of the Society, and, at the same time, it may be well to limit the privileges of non-residents in such a manner that the control of the Society's affairs should not pass out of the county, or that its permanents interests should not at any time be overwhelmed by temporary influences which may become predominant in consequence of a cheap and facile means of acquiring membership.

Agreeably with the resolution passed at our last annual meeting, the board of managers have had under consideration the propriety of uniting with our sister counties in the formation of a Long Island Agricultural Society, a project which, at present, is deemed impracticable (the Suffiolk County Society having established a permanent location for their fairs; and the grant of land to our own being such that it would be available only to a Queens County Agricultural Society); but it is believed that the most important objects will be attained by the proposed amendment to our constitution, which will thereby extend its benefits, not only to the counties on Long Island, but will invite to our fairs productions of superior merit, no matter where they originate, and without any prejudice to the local advancement which it is the chief purpose of the Society to promote.

I would call your attention to the fact that most of the premiums

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awarded at our winter meetings are for articles, the production and improvement of which can be and are encouraged by the awards at the fall fair; and I would, therefore, suggest the propriety of abandoning in the future the efforts to make an exhibition at this season, and recommend that the occasion be devoted to addresses and discussions upon the various subjects germain to the purposes of the Society.

Six years ago the ground which we now occupy was consecrated to the defence of a nation trembling upon the brink of ruin, by flinging to the breeze the nation's emblem and establishing here a camp of instruction in the arts of war. The tornado of civil strife swept on, leaving the marks of its desolation everywhere deeply impressed upon the social, political and material interests of the nation; but before its thunders had yet died out, by the magnanimity of the people of Hempstead, this same ground was rededicated to instruction in the arts of peace. But it is by the patriotic enterprise of the ladies alone that the glorious old flag floats again over this doubly consecrated soil. By their efforts was that noble flag-staff erected; by their efforts does that noble banner, with its peaceful inscription, cast its protecting shadows athwart our grounds—another of the many instances in which they have been instrumental in stimulating the patriotism of the people and giving material aid to whatever most advances the public welfare. Nor have their efforts been limited alone to these permanent improvements; but, in addition to the many attractive features they have added to our exhibitions, they have, by their persevering blows, materially reduced the magnitude of the debt which yet overshadows the Society; and, indeed, there is scarcely any department or any direction in which we can turn that we do not see and feel the beneficent and elevating influence of womanly enterprise. Far distant be the day when we shall fail to appreciate its gentle but unerring power.

To those gentlemen who have been actively associated with me in the management of the affairs of the Society is due this public acknowledgment of my gratitude; and to those who, from indifference or inability, failed to attend to the duties they had assumed, I desire to say that, aside from the injustice of imposing all the labors and all the responsibilities upon those who are willing to toil and make sacrifices, you are doing great injustice to the Society, and materially damaging the local interests which you specially represent in the board by the neglect to attend the meetings.

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Surely it cannot be that one person cannot be found in each town who has the interests of his locality sufficiently at heart to render this slight service. It is true that a much greater demand for the past two years has been made upon the time and attention of the managers than has been the case in previous years, or will be likely to occur for some time to come; although there is much need of further permanent improvements, such as fencing in the remainder of our grounds, the erection of a dining hall and kitchen, and buildings for the protection of carriages, machinery, &c., all of which are greatly needed and will doubtless eventually be made; but the constantly growing importance which invests the action of the Society makes it the more necessary that it should have the benefit of the wisdom and labors of all the members of the board.

To the secretary and treasurer, whose constant devotion to the duties of his post has only been equalled by the intelligence with which those duties have been discharged, too much credit can scarcely be given; and I would call your attention to the fact that the salary received by him is but a meagre compensation for his faithful services, which in justice to him and to itself the Society should increase; and I would suggest the propriety, if possible, of lightening the burthens with which he is at times almost overwhelmed, but which by his indomitable perseverance he has so far successfully encountered.

It only remains for me to thank you and the people of our own and the adjacent counties for the spirit and liberality with which the efforts of the managers have been so nobly sustained, regretting only that the imperfect discharge of my own duties should have been so poor a return for the distinguished consideration and uniform kindness with which I have at all times been greeted, and hoping that the triumphant success which has thus far crowned our efforts is only the prelude to a still more glorious and still more useful future.

The address was listened to with great attention, and on motion of Wm. Norton, Esq., a copy was solicited for publication in the proceedings of the Society.

The secretary and treasurer then read his annual report, which was unanimously approved and ordered to be printed.

The secretary also presented a document dedicated to the Society, written by Henry Onderdonk, Jr., of Jamaica, on the History of Ancient Agriculture, Manufactures, &c., of the town of Hempstead.

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On motion of John A. King, Jr., it was unanimously resolved to publish the document in the Society's report, and the thanks of the Society returned to the donor.

Officers for the ensuing year: Peter C. Barnum, Hempstead, President; Benj. W. Downing, Flushing, Vice-President; John Harold, Hempstead, Secretary and Treasurer.

Resolved, That the Senator and Assemblyman representing this county in the State Legislature be requested to use their influence in favor of any measure tending to improve the arrangements of markets in New York city, with especial reference to the ease and speed of producers in bringing their articles within reach of consumers.

The thanks of the Society was unanimously presented to the officers and managers of the Society for their services during the past year.

TREASURER'S REPORT.

At the commencement of the present year the balance on hand amounted to $254.85. The members' tickets were ready at an early period, and their sales soon placed us in funds to proceed with the unfinished work of last year and commence new operations.

There have been expended in improvements since the last annual meeting, not including carriage houses	$2,000 00
Reduction of debt	1,500 00
Interest	647 50
Total	$4,147 50
Amount paid for premiums	$1,864 60
Amount paid for premiums last year	1,535 88
Increase	$328 72
The Society now owes	$8,000 00
Receipts at gates and carriage tickets	$2,813 09
Receipts at gates and carriage tickets last year	1,879 50
Increase	$933 59
For rent of grounds	$757 00
For rent of grounds last year	225 00
Increase	$532 00
There is still a debt due to the Society for rent of grounds by the officers of the Sixth Brigade, N. G., S. N. Y.	$155 50
Members' dues from Jamaica, Flushing and Newtown	$756 00
do do do do last year,	432 00
Increase	$324 00

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The "Fair Expenses" exceed those of last year, but include the expenses of the Horticultural Show.

The financial Statement is as follows:

1867.

JOHN HAROLD, TREASURER, IN ACCOUNT WITH THE QUEENS COUNTY AGRICULTURAL SOCIETY.

DR.

Balance on hand			$254 85
Entrance and members' carriage tickets			2,813 09
Subscription to report			113 00
Subscription to flag pole			190 50
Special premiums			90 00
Rent of grounds and buildings			757 00
Sale of carriage houses			2,205 00
Received at seats			124 05
State treasurer			113 75
Donations			1,154 27
Life and annual members—Hempstead		$816 00	
do do	North Hempstead	582 00	
do do	Oyster Bay	447 00	
do do	Jamaica	295 00	
do do	Flushing	274 00	
do do	Newtown	193 00	
do do	Out of county	293 00	
			2,900 00
			$10,715 51

CR.

By premiums paid			$1,864 60
Fair expenses			1,308 93
S. T Taber, reduction of debt			1,500 00
S. T. Taber, interest			367 50
Benjamin D. Hicks, interest			280 00
Printing and incidental expenses			720 22
Construction account—planting trees		$116 22	
do do	hitching posts and fences	230 22	
do do	ladies' toilet	205 38	
do do	flag pole	292 35	
do do	carriage houses, stables &c.	2,624 50	
do do	general construction	884 40	
			4,353 07
Balance on hand			321 19
			$10,715 51

JOHN HAROLD, *Secretary and Treasurer.*

Dated HEMPSTEAD, *November 25th*, 1867.

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RENSSELAER.

TROY, *Jan.* 21*st*, 1868.

Received from H. W. Knickerbacker, treasurer		$419 94
Sale of tickets, rent of booths, &c		2,346 65
Life membership drafts		60 00
Rent of rooms		26 00
		$2,852 59
Paid for old premiums	$30 00	
Repairs on buildings	243 75	
Insurance	168 50	
Rent	100 00	
Taxes	147 07	
Interest	66 34	
Improving grounds	447 78	
Printing	279 32	
Labor	254 75	
Dinners at fair	97 00	
Premiums	595 00	
Premiums, special	30 00	
Sundry expenses	110 31	
Secretary	112 50	
Treasurer	150 00	
Balance in treasury	20 27	
		2,852 59

ELISHA WATERS, *Treasurer.*

Officers for 1868: Burton A. Thomas, President; Charles Davenport, Secretary; E. Waters, Treasurer.

ROCKLAND.

Our county fair was held at New City. The first day was devoted to exhibit the stock and articles, of which there was a good supply of each. Mr. McAdam, of Nyack, delivered an excellent address on the second day, after which an election was held, resulting in the selection of President, Peter S. De Pew; Secretary, A. E. Suffern, Haverstraw; Treasurer, Abram A. Demarest.

Amount of receipts from voluntary subscriptions		$122 50
From gateage		791 00
		$913 50
Amount paid out for premiums	$588 50	
Other expenses	325 00	
		913 50

ABRAM A. DEMAREST, *Treasurer.*

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ST. LAWRENCE.

To the Secretary of the New York State Agricultural Society:

SIR—The sixteenth annual fair of the St. Lawrence County Agricultural Society was held at Canton, on the Society's grounds, according to announcement, on the 24th, 25th and 26th September, 1867, and although the statement of the transactions of the Society for the year 1867, while presenting many features in common with previous years, yet calls upon us to record the gratifying fact, that the year just past has been the most successful one in the history of the Society, and enabled the Society to free itself almost entirely from debt.

The Society feels grateful for the measure of success which has attended its efforts during the past year, and trust that it is now in a position to increase its usefulness, and secure the confidence of all interested in its success.

The weather, upon the whole, was very favorable, and the exhibition and attendance greater than at any previous fair. The number of entries was 962, and it is gratifying to say, that with the exception of one or two, the whole of the classes, 21 in number, were well represented.

The display of stock was very good in short-horns, Devons and Ayrshires, natives and grade A; many of the grades being large and handsome.

The show of horses, mares and colts excelled anything that has preceded it.

Sheep, though they fell short in numbers from previous years, were good in quality.

Of swine, we had an excellent show, of the best breeds.

The poultry department, though not large, had some excellent specimens of the different varieties.

In dairy products the exhibition was good, and of superior excellence.

The number of agricultural implements was not as large as usual, but in the mechanical department there was a good show.

The display of fruit and vegetables was unusually large and excellent.

Floral hall, or ladies' department, was well and creditably filled, and added, as it ever does, to the interest of the exhibition.

A practical and instructive address was delivered on the afternoon of the third day by the Hon. A. B. James. of Ogdensburgh,

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President of the Society, and was listened to by the people assembled with marked attention and approbation. And, on the whole, the friends, patrons and officers of the Society have reason to be proud of the success of the Society for the past year.

The financial condition of the Society for the year 1867, as per treasurer's report herete annexed, is as follows;

RECEIPTS.

Balance from account of 1866	$193 45
Received from Treasurer State New York	212 50
Receipts of the fair and members' fees	4,508 73
Balance due treasurer	353 57
	$5,268 25

EXPENDITURES.

Paid for new seats, cattle pens and fences	$695 20
Debts and interest on debts	2,023 86
Premiums, as per vouchers	1,606 50
Expenses of the fair, printing, &c	942 69
	$5,268 25

The annual meeting of the Society was held at Canton, January 14, 1868, and the following officers were elected for the ensuing year: President, Hon. A. B. James, Ogdensburgh; Treasurer, E. Miner, Canton; Secretary, James S. Orr, Canton.

A vote of thanks to Ebenezer Minor, Treasurer, and the sum of fifty dollars; also, to James S. Orr, Secretary, the sum of one hundred dollars, for services rendered, was passed unanimously.

The draft of the proposed revised, condensed and amended constitution was then taken up, and the same having been read and amendments made, was adopted in the words following:

ARTICLE 1. This Society shall be called the "Saint Lawrence County Agricultural Society," and is formed for the purpose of improvement in agricultural knowledge and practice.

ART. 2. Every person paying for that purpose the sum of one dollar to the treasurer of the Society, shall be a member for the current civil year. Every person paying for that purpose to the treasurer of the Society the sum of ten dollars, shall be a member for life; but no member of the Society shall vote at any meeting or election unless he be qualified to vote at a general election in this county, or an adjoining county, for State and county officers, or be an alien domiciled in the county.

ART. 3. The officers of the Society shall be a president, (12) twelve vice-presidents, a treasurer, superintendent and secretary,

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to be elected annually at a general meeting of the Society, to be held at Canton, on the second Tuesday of January in each year, by a majority of the members present, to hold their offices for the term of one year, or until others shall be elected in their stead.

ART. 4. The officers mentioned in the third article shall be the executive committee of the Society, seven of them being a quorum, and as such committee shall have the entire control, management and direction of the affairs of the Society, except as hereinafter limited, and shall have power to fill any vacancies in the offices of the Society which may occur during the year.

ART. 5. An annual cattle show and fair shall be held by the Society at such time and place, within the county, as the executive committee shall appoint.

ART. 6. No purchase or sale of real estate shall be made by or on behalf of the Society, unless first authorized by a vote of a general meeting of the Society.

ART. 7. The receipts and income of the Society, in each year, shall be applied, first, to the payment of the expenses of management and of the fair; second, to the payment of the premiums and prizes awarded at the fair; and no other appropriation of such receipts or income shall ever be made until such expenses, prizes and premiums shall be fully paid or provided for.

ART. 8. No officer or officers, nor the executive committee, shall have the power to incur any debt or contract any obligation for the Society (except for usual current expenses and for premiums), unless expressly authorized by a general meeting of the Society.

ART. 9. Special general meetings of the Society may be called by the executive committee at any time, at Canton, by notice to be published in all the newspapers printed in the county, or in at least three such newspapers, once a week in each paper, for six weeks preceding the time of such meeting.

ART. 10. This constitution may be amended at any general meeting of the Society by a two-third vote of all the members present and voting, provided notice shall have been given by public advertisement in the manner prescribed in article 9, that it will be proposed to amend the constitution at such meeting, and of the general nature of the amendment to be proposed; and unless such advertisement shall have been so made as aforesaid, no such meeting shall have power to make any amendment or alteration of this constitution. All which is respectfully submitted.

. B. JAMES, *President*. JAMES S. ORR, *Secretary*.

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SARATOGA.

Saratoga Springs, *December* 31, 1867.

To the Executive Committee of the New York State Agricultural Society:

Pursuant to the fourth section of the act entitled "An act to promote agriculture," passed May 5, 1841, requiring "the presidents of the several county agricultural societies, who shall receive or expend any of the moneys appropriated from the State treasury, annually, in the month of December, to transmit to the Executive Committee of the New York State Agricultural Society an abstract of the proceedings of such county society during the past year," the Saratoga County Agricultural Society respectfully reports the following as an abstract of its proceedings during the past year:

May 27, 1867.—The first regular meeting of the board of managers was held on the 27th day of May, when it was resolved to hold the annual fair on the 3d, 4th, 5th and 6th days of September, on the Society's show grounds, in the town of Saratoga Springs.

August 8, 1867.—The next meeting of the board was held on the 8th day of August. A liberal premium list was adopted, amounting in the aggregate to over $1,500. The judges were selected at this meeting, and all the preliminary arrangements were made for the approaching exhibition.

TWENTY-SIXTH ANNUAL FAIR.

First Day.—The first day of the fair was devoted, as usual, to entering, registering and arranging the animals and articles for exhibition.

Second Day.—The books of entry were kept open until twelve o'clock of this day, and the following shows the entries registered in the several classes:

Class 1.	Agriculture	22
Class 2.	First class horses	69
Class 3.	Second class horses	44
Class 4.	First class cattle	24
Class 5.	Second class cattle	10
Class 6.	Spanish merino sheep	28
Class 7.	Long wool thoroughbred sheep	17
Class 8.	Middle wool sheep	3
Class 9.	Grade merino sheep	3
Class 10.	Swine	19
Class 11.	Poultry	37
Class 12.	Mechanical productions	81
Class 13.	Agricultural implements	23

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CLASS 14.	Butter and cheese	9
CLASS 15.	Fruit	14
CLASS 16.	Garden vegetables	23
CLASS 17.	Household productions	34
CLASS 18.	Painting, drawing, embroidery and needle-work	53
CLASS 19.	Flowers	26
CLASS 20.	Canned fruit and preserved vegetables	27
CLASS 21.	Trial of trotting horses	12
CLASS 22.	Miscellaneous articles	26
CLASS 23.	Foreign entries	3

The judges were called at one o'clock, P. M., vacancies filled, and the entry books delivered, preparatory to making their examinations.

Third Day.—This was the great day of the exhibition, when the whole agricultural population of the county seemed to have come together, and before noon the show grounds were filled with a multitude of people.

The judges continued their labors until the hour announced for the annual address, when the show buildings were closed and the multitude gathered around the speaker's stand to listen to this interesting part of the proceedings.

At 2 P. M., the Society was called to order by the President, upon whose invitation the Rev. Dr. Woodbridge offered prayer.

A committee was announced to nominate officers of the Society for 1868, and to report at an adjourned meeting on Friday, at 2 P. M.

The Hon. Horace Greeley was then announced to deliver the annual address. His address was replete with practical suggestions and advice on the ennobling pursuit of agriculture. It went home to the hearts and understanding of his hearers. He spoke for nearly an hour, and held the vast audience in almost breathless silence by the pleasing and happy manner of expressing his ideas. At the conclusion of the address, the following resolution, offered by the Hon. Edward Edwards, was unanimously adopted:

Resolved, That the thanks of this Society be respectfully tendered to the Hon. Horace Greeley for the very able and instructive address delivered by him on this occasion, and that a copy thereof be requested for publication in the transactions of this Society.

Fourth Day.—The interest in the exhibition was kept up during the fourth and last day, although the crowd had somewhat diminished from the preceding day.

At 2 P. M., the Society was again called to order by the president,

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when the committee to nominate officers submitted their report, as follows: President, Frank D. Curtis, Charlton; Corresponding Secretary, James Thompson, Ballston Spa; Recording Secretary, J. A. Corey, Saratoga Springs; Treasurer, Milo J. Jennings, Saratoga Springs.

These nominations were confirmed by the Society, and the persons declared duly elected officers for the year 1868.

The reports of the judges were then read, and premiums awarded, as follows:

On agriculture proper	$13 50
On first class horses	86 00
On second class horses	81 00
On first class cattle	51 50
On second class cattle	47 50
On Spanish merino sheep	66 00
On long wool thoroughbred sheep	63 00
On middle wool thoroughbred sheep	22 00
On grade merino thoroughbred sheep	23 00
On swine	54 00
On poultry	15 50
On mechanical productions	64 50
On agricultural implements	23 00
On butter and cheese	19 00
On fruit	10 50
On garden vegetables	23 50
On household productions	33 50
On painting, drawing, embroidery and needle-work	102 50
On canned fruit and preserved vegetables	7 00
Miscellaneous articles	12 00
Trotting horses	175 00
Total money premiums	$993 50

Besides the above, forty-four volumes of the "Transactions of the New York State Agricultural Society" and eleven diplomas were awarded to successful applicants or exhibitors.

The weather was highly favorable to the exhibition, and all the regulations and arrangements were carried out in harmony with the best organized and most successful agricultural associations.

It was a source of regret that the entries in several of the departments were not as large as usual, and unless better sustained hereafter, it is to be feared that we shall lose our character as a useful auxiliary in promoting the interests of the agricultural and household arts.

Financially, the fair was eminently successful; but this is not

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the true view to be taken of these organizations. Without exhibitors, these gatherings will cease to be attractive; and when the crowd of visitors go away disappointed with the exhibition, they will be less likely to come again to swell the receipts where nothing is to be seen except the *people*. If these agricultural associations are worth preserving, our farmers and the friends of agriculture should intermit no efforts to keep up the interest in these annual shows. An interesting and attractive exhibition will call out the people, and thereby augment the means by which the premium lists are increased to invite a more lively competition for the prizes in every department.

The following is an abstract of the accounts of the Society's treasurer for the year 1867:

RECEIPTS.

State appropriation of 1866	$151 25
Fifteen life memberships	150 00
Five hundred and sixty annual memberships	560 00
Tickets sold at the fair in September	1,462 25
Entering fees to trial of speed of horses	47 50
For refreshment saloon and inside stands	139 00
For use of track in summer (balance)	50 00
Fines collected at fair	8 00
Balance in treasury at last report	32 03
	$2,600 03

DISBURSEMENTS.

Paid out for premiums	$804 25
For superintendents of exhibition	164 75
For gate-keepers	80 50
For police	112 75
For clerks and clerk hire	92 50
For lumber and building material	179 00
For premiums on speed of horses	175 00
For labor and team work	221 43
do do	53 10
For printing, books and stationery	151 74
For forage for animals at fair	122 46
For salaries	150 00
Interest on debts owing by Society	138 92
For postages and law services	27 55
For printing bill of 1865	30 00
Miscellaneous items	6 50
Insurance on property	27 00
Balance in treasury, Dec. 31, 1867	6 08
	$2,604 53

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In thus transmitting the formal history of the proceedings of this Society for the past year, we have very little to add to our previous reports on the general subject of agriculture.

Although this county may not be entitled to rank as a first class agricultural district, we possess all the material elements for becoming so, and the fault is our own if we do not occupy that proud position. With all the varieties of fertile soils, a fine, healthy climate, and good markets, no rational cause can be assigned for any disparity in good farming between this and other portions of the State. Our arable lands are adapted to the growth of all the cereals indigenous to this high latitude, and if the same efforts were employed, and the same means were applied, in the tillage of the earth that are voluntarily bestowed on other objects, we should soon redeem our character from the imputation of being a poor farming community, and take our place in the front line of agricultural counties.

Experimental farmers, "like angels visits, are few and far between" in this county. These pioneers of thought and action would here find a large field for their benevolent labors. Our farmers are too indifferent to their own interests to spend any labor or money on untried systems or new inventions, designed to lessen their own toils. The introduction of a new labor-saving implement is generally looked upon with suspicion or distrust, until some more liberal, experimenting neighbor has demonstrated its utility. The farmers, as a class, are too cautious to adopt a new theory until they *know* it to be true. It has taken years to establish the practical utility of the mower and reaper; and if the original inventor expects to outlive the prejudices still existing against this invaluable implement in some parts of the country, he may hope on in vain.

Educated farmers, those who have a theoretical as well as practical knowledge of their profession, are the most useful teachers of agricultural science; and wherever one of this class settles down to an agricultural life, there we see the masses of his fellow farmers willing to look to him for those precepts which they neglect to learn from agricultural books. These quiet, unobtrusive teachers are doing more to promote the cause of agriculture, and enlighten the public mind on the science of cultivating the soil and in the management of the farm, than all the public journals and popular lecturers, in which this country abounds. Combining the practical with the theoretical, they illustrate their ideas and demonstrate

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their facts as they go along, and thus eradicate old prejudices which no metaphysical reasoning could remove.

In our former report, a brief reference was made to the improvement in the manufacturing of milk into cheese, and we are now enabled to speak more in detail on this branch of agriculture. The establishment of cheese factories is becoming an interesting feature in the farmer's profession in this county. One of these institutions is located and in successful operation in the town of Ballston, one in Charlton, another in Galway, another in Milton, and another in Moreau, in which, as we are informed, an aggregate of 250,000 pounds of cheese has been made and sold within the past year, and at the average price of fourteen cents per pound, principally for home consumption. These factories monopolize all the surplus milk for miles about them, and promise to be profitable investments for all concerned. They have evidently improved the quality of cheese, a desideratum with consumers of this popular item in our daily food. Hence, more attention is being paid to milch cows, and our farmers are seeing the necessity of improving their breed of this profitable class of cattle.

Thoroughbred stock is taking the lead with intelligent farmers, more so than formerly. A number of Ayrshires have recently been brought into the county, and it is believed that they are better adapted to this climate, and will thrive better under our close pasture-feeding system than any other imported breeds. A cross of the Ayrshire with our native cows would doubtless improve the latter for dairying purposes.

A few years ago, when pork was in better demand, and corn was one of the staple products of this county, it was justly celebrated for the excellence of its swine; but latterly, since the cultivation of the potato has usurped the place of corn on all the corn-growing lands, and other meats have driven pork from the table, very little attention has been paid to swine in this county for several years past.

The State Fair, at this place in 1865, was the means of introducing the Jefferson county breed, which is now regarded with much favor. Frank D. Curtis, Esq., of Charlton, has embarked with commendable zeal in the business of swine breeding, preferring the Jefferson county to any other breeds in this State. He has made it a specialty to improve the quality and elevate the character of these hogs, and is the only breeder in the county who has undertaken to supply the demand for these improved pigs in

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all this region. His labors in this direction will no doubt be appreciated by a discerning public, whose interests are of paramount importance.

Manufacturing enterprises are monopolizing the attention of many of our citizens and a large amount of capital heretofore employed in agricultural pursuits; and among these is paper-making, which furnishes a market for all the straw grown in the county.

If the same rule was applied to the actual *owner* which the law applies to an out-going *tenant*, whereby the manure made while in the tenant's possession cannot be removed or taken off the farm, less abuse would be created by the deteriorating system of cropping, year after year, and disposing of the legitimate fertilizers that belong to the soil from which they sprung. The productiveness of the soil in the older States depends entirely upon the system of tillage. Without some return to the earth for the crops of which it is annually despoiled, it will soon cease to yield an equivalent for the labor and expense bestowed in its cultivation. The exhausting practice, now so common, of selling off the hay and straw is ruinous to our grain and grass growing lands, and is condemned by the soundest principles of agricultural economy. Hence it becomes an interesting question, whether the arable lands are not deteriorating to such an extent as ere long to be rendered non-productive of all the staples for which they were celebrated half a century ago. It is a mistaken notion that any soil will continue to yield spontaneously for any considerable length of time without retaining something of the fertilizing manures which it sends forth. A prudent, judicious farmer will not despoil his land of its own recuperative powers; and if he takes off his hay or straw, he is sure to bring back something else of equal value in the form of other manures. There is nothing in all the vegetable kingdom that does not possess some vitality, something to contribute to the propagation of its own species, and any system of the earth's tillage which seeks to rob the soil that sustains all animal life is false in theory and destructive of the best interests of the human race.

All of which is respectfully submitted.

J. A. COREY, *Secretary.*

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SCHOHARIE.

The undersigned would respectfully report the following as the results of the transactions of Schoharie County Agricultural Society and Stock Growers' Association, for the year 1867.

The fair was held on the grounds of the Stock Growers' Association, in the village of Schoharie, October 9th, 10th and 11th.

The exhibition was a creditable one, and may be regarded as a success in every particular. The first two days were all that could be desired as to the weather. The number of people in attendance was far in excess of previous years, and had it not been for the heavy rains on the last day, the receipts would have been over $1,000.

The display of cattle was larger than at any previous fair. The exhibition of ox teams was large and splendid. Some excellent sheep and swine were exhibited. The show of horses probably was never surpassed at any fair in this county. In the way of fruit, vegetables, and other farm products, the display was excellent. The cultivation of the grape has been successfully engaged in by some of our horticulturists, and several fine varieties were exhibited.

In the manufacture of carriages Schoharie stands second to no county in the State, and fine specimens of these articles found a place upon the grounds.

Agricultural and domestic implements were well represented, there being a large number of entries. The spacious hall in the building of the association was never so well filled. An endless variety of fancy and useful articles, paintings, needlework, &c. The ladies fairly outdid themselves; in fact, every department of industry was represented well.

The entries made this year were one hundred and fifty in excess of last year, and we believe the awards of premiums gave satisfaction. Receipts and disbursements the present year as follows:

Balance in hands of treasurer		$9 00
Received for admission fees, and from other sources		830 69
		$839 69
Paid premiums awarded	$435 67	
All other expenses	394 01	
		829 68
Balance on hand		$10 01

Officers, 1867: Tobias Bouck, President; J. C. Van Tuyl, Secretary; Ralph Brewster, Treasurer.

J. C. VAN TUYL, *Secretary.*

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SCHUYLER.

COL. B. P. JOHNSON, *Secretary New York State Agricultural Society*:

In presenting the transactions of the Schuyler County Agricultural Society, we remind you that this county is the youngest of the long list that make up the Empire State. If this report, when placed by the side of those from the older counties of a half or a whole century's existence for improvement, development and progress, should not command equal attention, and an apology should seem to be required, let me offer this fact in her behalf.

Should not such comparison develop her youth, then permit me to claim for her the honor that may follow.

Though little Schuyler stands at the foot of the list of counties, in years and experience (and in some respects may have come up under great tribulation), we dare warrant that she exhibits great vigor and determination; and we hope and trust that she will possess wisdom to properly conduct herself.

Schuyler desires to so demean herself as to merit and receive the brotherly regards of the older and honorable members of this numerous family; and if it is hinted that the youngest is generally spoiled, we trust that this may prove an exception to the general rule.

All stand ready to respect and honor the names Seneca, Franklin, Washington, Steuben, Herkimer, Sullivan. Putnam, Jefferson, Greene, Madison, Monroe, Wayne, Warren, Clinton, Livingston and Yates, both in parentage and offspring, and we claim from the first that Schuyler may be added to that honored list, and hope much from the last.

At the annual meeting held at Watkins, January 11, 1868, the following officers were elected: President, Col. E. C. Frost, of Watkins; Secretary, E. Ingalls, of Watkins; Treasurer, Dr. J. W. Thompson, of Watkins.

The financial condition of the Society, as per treasurer's report, is as follows:

Total receipts during the last year	$1,426 18
Total amount paid out	810 93
Balance on hand	$615 25

A very great improvement has been made in the pecuniary condition of the farmers of Schuyler within the last few years, perceptible in their dwellings, and other home improvements.

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Schuyler has a mixed agriculture. Grass and dairy products, grain, including barley, and her surplus fruit has been a large source of income. Some of her farmers realize more from the product of their orchards than the whole farm besides.

Grape growing has become a large business, especially along the shores of the Seneca lake and the valley at its head.

The land along the shores of this lake, once considered the back bone of the farms to which it belonged, and considered almost valueless except for fuel, is now worth more than any lands in the county for grape growing.

Last season, the first grapes that were marketed in New York were from this locality, being on the 11th of September; variety, the Hartford Prolific.

In connection with this, and as a reason for the early maturity of vegetation of all kinds, we may state that the lake does not freeze during the winter, but that steamboats make regular trips during the whole winter from Watkins to Geneva, forty miles, and back each day, and from Geneva to Watkins and return, a fact which is almost incredible; the like is believed to be unknown in such a climate.

While they along the Hudson are shut in from all water communication by ice—and the New York presses state that the ferry boats cannot make their regular crossings in consequence of the ice—here at Watkins the steamboats are making their regular trips.

In consequence of its peculiar geological and surface formation, and as one of the interesting and attractive localities belongmg to and making up the general features of the State, we may mention the Watkins Glen, near the head of the lake, located in part within the corporate limits of the village of Watkins, the county town of the county, which has been visited for the last few years with great satisfaction by some twenty-five or thirty thousand persons each year, and pronounced by those who have traveled extensively in this country and Europe, the most interesting locality they have ever seen.

E. C. FROST, *President.*

SENECA.

OVID, *February* 8, 1868.

COL. B. P. JOHNSON, *Secretary of New York State Agricultural Society, Albany:*

DEAR SIR—At a meeting of the Seneca County Agricultural Society, held at Romulusville January 15, 1868, the following offi-

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cers were elected for the ensuing year: President, William Dunlap; Secretary, C. E. Sentell; Treasurer, John D. Coe; Corresponding Secretary, Isaac N. Johnson.

The following report was read and accepted:

JOHN D. COE, TREASURER OF SENECA COUNTY AGRICULTURAL SOCIETY, IN ACCOUNT WITH SAID SOCIETY, DEC. 23, 1867.

Receipts:	
To balance on hand as by last report	$263 28
Received from members, at one dollar each, at annual fair	629 00
For tickets, single admission, the two first days, at 15c; the third day at 25c; for single carriages, 10c; double, 20c, and same for carriages of members the last day	492 79
From seats at 10c each	70 92
For eating tent	50 00
For show exhibitions	7 00
For entrance of horses to trots	117 50
From State of New York, appropriation to agriculture	92 50
For lumber, &c., sold after fair, used at fair	25 66
	$1,748 65
Payments:	
Paid at winter meeting	$45 50
Premiums awarded at fair	354 00
Fair expenses	654 86
For printing tickets, &c	130 00
Premiums on trots	300 00
Balance in hands of treasurer	264 29
	$1,748 65

Very truly yours,
WILLIAM DUNLAP, *President.*

STEUBEN.

BATH, *December* 31, 1867.

COL. B. P. JOHNSON, *Secretary, &c.:*

DEAR SIR—In accordance with the requirements of the statute, I herewith transmit to you a statement of the proceedings of the Steuben County Agricultural Society for the present year.

At the annual meeting, in January last, the necessity of enlarging and improving the grounds of the Society, which are located in this village, of erecting new and more commodious buildings, and providing sufficient sheltered accommodations for the exhibition

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of sheep and cattle, was discussed, and a board of officers elected to serve for the present year, who assured the public that, with the assistance of the citizens of this village and other friends of the Society, the improvements above suggested should be made, and the Society placed on a firmer basis, and made a fit exponent of the agricultural wealth and industrial enterprise of the county of Steuben. Accordingly, in the month of April last, the executive committee purchased about eight acres of land in the rear of and adjoining our old fair grounds, thereby increasing the size of the grounds so that they at present include fourteen acres, thereby not only securing to the Society one of the most valuable pieces of land in the village, but also a most desirable and convenient location for the holding of the fairs; the whole grounds being then inclosed with a suitable and substantial high board fence. Our present agricultural hall was erected at a cost of $3,000; in size it is 60 by 100 feet on the ground, with a gallery around the interior, and properly fitted up with offices for the different building superintendents, and furnished with every convenience that could suggest itself. New and most extensive sheep houses, conveniently arranged, were then erected, and more extensive accommodations for the exhibition of cattle and horses. The building hitherto known as the secretary's office was removed and suitable and convenient offices for the treasurer and secretary, with rooms for committees, erected in its stead. The whole grounds were then rearranged, and a new and most perfact half-mile track, properly graded and neatly inclosed and provided with a judges' stand.

In the completion of all these improvements, the executive committee expended some $8,000, of which sum about $2,500 was raised by voluntary subscription, leaving the Society in debt $5,500, of which sum $2,639 was secured by a mortgage on the grounds, running for a long term of years.

Every effort was made to insure the success of our fifteenth annual exhibition. In addition to our new buildings and other improvements, the attraction of a larger premium list than had ever before been offered was presented to our people.

The exhibition was held on the 25th, 26th and 27th days of September, and was, in every sense of the word, a success; the weather fine, and the attendance unprecedentedly large.

The exhibition of cattle, although good, was not as large as at some previous fairs, but the show of sheep was large and exceed-

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ingly fine. The centre of attraction in the sheep department, however, was the noted ram "Faultless," owned by Mr. J. A. Wright, of Vermont, and valued at $3,000. The display of horses was larger and better than ever before, and formed an important feature of the exhibition. Of agricultural implements, domestic manufactures, fancy articles, &c., there was a good display in quality and quantity; and also a good exhibition of fruit, particularly of grapes, and a fine show of flowers. The collection of stuffed birds (over 1,000 specimens) owned and exhibited by Dr. J. W. Velie, of Bath, was much admired, and constituted one of the most attractive features of the exhibition.

The *Steuben Courier*, in speaking of the fair says, amongst other things:

"Agricultural hall was thronged from morning until night each day of the fair, and was much admired for its magnificent proportions, its convenience and arrangements, as well as for its well displayed contents. We think we can safely say that no other county in the State can boast of as fine and well an arranged fair building. The large additions to the grounds of the Society, and the splendid half-mile track, were subjects of general commendation. A finer or better graded half-mile track, we venture to say, cannot be found in any interior county in the State. The executive committee are entitled to great credit for the nerve and energy displayed by them in making these long needed improvements, trusting, as they did, largely to the public to sustain them in incurring so heavy an outlay, and they may well feel proud of the success which has rewarded their efforts. The enlarged fair grounds and buildings are a credit to the Society, and an ornament to the village in which they are located."

Solon Robinson, the veteran agricultural editor of the *New York Tribune*, was present at the fair, and in a letter to the *Tribune*, written subsequent to that time, in speaking of our grounds and buildings, said: "I found one of the best new buildings and fair grounds in the State."

The annual address, delivered by Major General W. W. Averell, U. S. Consul General to Canada, was a finished and well delivered production, and was highly commended by all who listened to it. The fair, financially, was a decided success, the receipts amounting to over $3,000, being nearly double that of any previous year. It is estimated that at least 10,000 persons were present on the grounds during the three days.

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The following are the receipts and expenditures of the Society for the present year:

Cash in hands of treasurer at the beginning of the year.....		$456 49
Received from State.....		181 25
From B. F. Young, agent of the Johnstone estate (donation)		50 00
From J. Fellows, agent of the Pulteney estate (donation)....		25 00
Tickets sold, and entrances at fair.....		2,110 49
From eating department at fair		718 79
From agricultural hop.....		182 89
From horse fair.....		135 16
From voluntary subscriptions to improvements.....		2,374 98
		$6,235 07
Premiums paid at annual fair.....	$520 00	
Paid for the erection of new buildings, fences, &c., and paid out on the purchase of additional lands, and current expenses of the year.....	5,614 52	
		6,134 52
Balance in Society's treasury.....		$100 55

At the annual meeting to elect officers for next year, the following board was unanimously elected: President, Robert B. Wilkes, Bath; Secretary, Reuben E. Robie, Bath; Treasurer, George W. Hallock, Bath. All of which is respectfully submitted.

REUBEN E. ROBIE, *Secretary.*

Annual Address.

BY MAJ. GEN. W W. AVERELL, AT BATH, SEPTEMBER 27, 1867.

Gentlemen of the Agricultural Society, and Fellow Citizens:

The invitation of your Society to deliver an address on this occasion was received by me with mingled feelings of pride and apprehension. Proud of your remembrance and consideration, I was fearful that, in the midst of engrossing public duties, I should not find the necessary time to prepare myself for the trying effort of speaking to an assembly of neighbors and friends.

Although practically acquainted with agricultural industry in early life, during the lapse of eventful years, forgetting the experience of youth, I have had little opportunity to observe the progress and improvements that have been made, so that were the tranquil independent life of the farmer again my own, I should undoubtedly be obliged to seek instructions from the members of your Society, and yet your flattering regard has invested me to-day rather with the character of mentor than the more fitting one of pupil.

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PROGRESS OF THE COUNTRY.

In this vehement age, and especially in America, where almost everything is done through associations, it is very difficult to keep step with the rapid march of improvement, and on that account I have all the more pleasure in congratulating you upon the proud position you have achieved among the leading societies of the country.

Many here can remember when wolves howled in the unexplored woods and dark solitudes of this county. Now, from the summits of our hills, as far as the eye can reach in every direction, it must traverse cultivated landscapes, in which forests are diminished to groves with broad farms and checkering fields between. The meeting here to-day in this spacious edifice and in these beautiful grounds of the farmers and manufacturers of the county, who have brought with them the best results of their industry in friendly rivalry and competition, is a splendid illustration of the character, and progress of all Americans—a brilliant exposition of the powers and tendencies of free labor—a proud and graceful token of snbmission to the will of Him who has said: "In the sweat of thy face shalt thou eat bread." He will smile on a people who so well recognize their duty in their doom—the universal doom of labor.

Agricultural labor is a theme which I cannot approach without trepidation. Upon the importance which is attached to it depends in a great measure the well being of this nation.

IMPORTANCE OF AGRICULTURE.

Laws and governments are born of society. The organization of society depends upon the character and condition of its labor—civilization, religion, education, wealth, and every family and social relation rest upon the same foundation. Unquestionably, the mysterious phenomenon of life which we see in animals and plants depends upon the soil, but the condition and duration of that life is almost infinitely modified by agriculture. Many of the vast treasures of the soil developed by labor, without it would remain forever worthless. Nature left to herself would bring forth wildernesses, deserts and barbarians. Through labor we make our nearest approach to the creative function. He who knows all from the beginning had provided the *soil* long before man came into the world. Let us briefly review the phases of its formation.

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FORMATION OF SOIL.

Across the domain of existing knowledge, the sciences and arts go arm in arm. Not one of them may be known without making the acquaintance of her immediate companions; but as we follow them onward and upward the outlines which define and individualize them become more and more dim, and finally they all merge into an identity in the blaze of truth. The horizon of our intelligence must embrace geology, astronomy, chemistry, physiology, meteorology, the mathematics, mechanics and all their auxiliary sciences in order to enable us to fully understand labor and appreciate the science and art of agriculture, the parent of all industries.

Groping in the shadows of time, we are ever striving to penetrate the infinite past. We live—we set out to learn why. The slightest motion or sound arrests our attention and directs our efforts. From a falling apple we start on a long and toilsome journey. Creeping along the "footprints of the creator" and reading the "testimony of the rocks," we reach that initial instant when God said, "Let there be light, and there was light." Here we stop. We can get no further into that infinite. Henceforth, waiting through durations which seem eternities, we behold a vast nebulous mass "without form and void," torn from an embryo of worlds, and slowly condensed into a liquid globe. All the elementary substances which compose the material of the earth, about three score in number, and all the countless forms now existing upon it were then swallowed up in a burning, boiling ocean.

Amid frightful convulsions, its waves are gradually conquered and quieted by congealing continents. The forces of nature are never idle. Endless change is their tendency. Each and every effect is a link in a chain without beginning or end. God is the only isolated fact. Nature never repeats herself—no two forms are ever exactly alike. Whatever is built up by one force is torn down by another, to furnish material for new forms to be in turn destroyed. The hardening surfaces are agitated like the sails of a tacking ship. Worn, warped and wrinkled, as the globe shrinks with cold, they furnish material for a primitive soil in which the simplest forms of life appear in plants and animals.

The earth growing colder contracts its crust, and bends or breaks the valleys in, leaving chains of mountains reared in the atmosphere. The subsiding seas help to form the hills. A uniform rotary motion of the globe about its axis modifies its shape, and in connection with heat gives motion and direction to

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the currents of the air and ocean. The winds snatching the vapors from the waters fly to the mountain tops, where the cold compels them to relinquish their prey, and the rains fall, the springs bubble, and the rivers run back to the sea, carrying along the ruins of the rocks which the wind, rain and frost have made, with the debris of dead plants and animals to form the soil of the valley and plain. We know that nearly half a million different species of animals and fifty thousand species of plants have appeared, lived and become extinct as the ever changing climate became unfitted for the old and ready for the new. All return to the soil. Nature assumes a sublime composure, only broken by complaining volcanoes, to witness the creation of man. The billowing ocean without a sail, the winds rustling and moaning through boundless forests echoing the songs of birds, the glorious sunlight of day and glittering stars of night, all proclaimed a new scene in the drama of creation, and demanded a new actor.

UNIVERSAL DOOM OF LABOR.

Plants had arrived at the verge of an animal kingdom without a king. Living force slumbering for ages in the rocks, aroused and organized in plants and animals, was at last wedded to a soul in a Godlike form. This image of God—man—heard first these words: "Be fruitful and multiply and replenish the earth, and subdue it, and have dominion over the fish of the sea, and over the fowl of the air, and over every living thing that moveth upon the earth. Behold, I have given you every herb bearing seed which is upon the face of all the earth, and every tree in the which is the fruit of a tree yielding seed." Man questioning, sought the fruit of the tree of knowledge. "In the sweat of thy face shalt thou eat bread," was his answer. Since then he has striven for happiness. Labor was the sceptre which he must henceforth wield in his dominion over earth; but, disdaining its honors, he has ever sought to avoid its burden because his hands were hardened and his back was bent. He became fruitful—multiplied and spread over the earth. Different climates have modified his constitution, complexion and language, and given birth to races.

MISTAKES AND DECAY OF NATIONS.

Emerging from a nomadic condition, various social organizations, founded upon the dignity or degradation of labor, have, in the youth of every nation that has existed, directed its attention to agricultural industry; then to manufactures, upon which towns

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and cities were built. Domestic and foreign commerce succeeded. With acquired wealth came pride and a disposition to domineer, and the original foundation, agriculture, was forgotten in its debasement. Disease, decay and death ensued. All that remains to us of the nations of remote antiquity are disputed sites of empires, ruined cities, broken columns and forgotten shrines. Is not the life of a nation like that of an animal or plant, a vortex which, starting from a point, whirls with increasing scope until its strength is spent, and its fragments sink into oblivion? Is there no enduring foundation upon which human government may be established? Shall we never learn how to "replenish the earth and subdue it?" Of the condition of labor in ancient times, we know but little; but we may suppose that they who builded Jerusalem and Babylon, Tyre and Sidon, and they who piled up the pyramids, must have had some toiling millions engaged in providing subsistence for the workmen and revenues for the governments that paid for their labor. Why was the prosperity of Egypt and Chaldea changed into the "abomination of desolation?" When we follow agriculture from Egypt to Greece, it is with the expectation of witnessing an advance in the art and an elevation of the laboring classes. Temples and palaces bedazzle our vision with their exquisite architecture, and we behold noble youths waiting upon the lips of her philosophers, orators and poets. We think we have found human happiness; but, alas, when we penetrate beyond her bewildering immortalities to the substratum, we come upon bowed-down menials without any recognized rights. Agriculture is advanced, but its labor is dishonored. We watch the growth and glory of Greece, and observe her culmination and decay, in spite of the efforts of Lycurgus in Sparta, and Solon in Athens.

To a beneficent climate, and a certain isolation in history, she owed the development of her people and the immortality of her arts and literature.

But all her exceptional advantages could not prevent her being overrun and swallowed up by her vigorous and expanding rival Rome. Why? In Rome agricultural labor possessed a dignity which lasted four hundred years. The nobility, vigor, fortitude and endurance, which are embodied in our idea of the Roman character, owed their existence to the equality of conditions which existed amongst her citizens, and to the honorable character of her labor. Her power was proportioned to the virtues of her people.

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Carthage, the mistress of North Africa, whose empire extended from Cyrenaica into Spain, with her formidable fleet, hundreds of towns and cities, her markets crowded with the produce of the whole world, had an excellent system of agriculture and over two hundred agricultural colonies. But she imported slaves, and her labor was degradation. And the time came when a Roman sat on the ruins of Carthage. But the age of disinterestedness and stoic virtues passed away in Rome. Lands came to be regarded as a means of power instead of subsistence, and were engrossed by great proprietors who absorbed the little. Her citizens became infected with the poison of luxury and avarice. Agriculture was modified, slaves took the place of free labor. There was a coresponding modification of manners, customs, laws and religion. The policy of Rome had been conquest, for which armies were required. While glory and renown awaited the succesful soldier, distressing burdens fell upon labor. There were no more pictures of Cincinnatus being called from the plow to command Roman legions. Good order waited on oppression.

SLAVE LABOR.

In all nations, ancient and modern, slave labor has not only proved unprofitable, but the most expensive. The interest of the slave was to obtain his subsistence with as little labor as possible. When the privilege of acquiring property has been denied to men, agriculture has declined and the soil become unproductive.

Labor is the lever that moves the world,—and the decline of the Roman empire began with its degradation. Civilization had wandered from one transitory empire to another, until exhausted and discouraged at the fall of Rome it sank into the fallow ground of the middle ages, The history of agriculture through those eleven dark centuries involves the woful tale of men called slaves, villains, metayers, and, finally, tenants and yeomen. Upon the gloom which shrouded their lashes and leases, and taxes and tallage, dawned the morning star of Democracy.

The feudal tenure grew weak. The natural tendency of society to an equality of conditions, which has nearly reached its goal in America and is felt in all the nations of Europe, began to effect the feudal structure. Freemen with the right to acquire property, displaced the slaves. There was a gleam of happiness for the laboring man, the happiness of which the inspired preacher speaks in that mournful story of human vanity and folly, "There is noth-

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ing better than that a man should rejoice in his own works, for that is his portion."

CLIMATE.

The refraction and reflection of sunlight upon falling drops of rain produce that beautiful spectrum called the rain-bow, in which the colors appear regularly arranged in belts. The same sunlight, thrown upon this great globe, creates a climate-bow which encircles the earth's surface, but in which the climate-belts, corresponding to the different colors of the rainbow, are not of uniform breadth or direction, owing to a variety of topographical influences. The entire climate-belt, containing favorable abodes for men, includes only one-third of the earth's surface. There are two similar belts, one north and the other south of the equator. But the most genial portion of the one south lies almost entirely in the ocean. There is no influence more potent in determining the constitution, character and habits of men than climate. It gives rise to a variety of races which, in their migrations, seldom depart from the zones which have modified them. The zone in the northern belt, in which the mean annual temperature ranges from forty to seventy-five degrees, is regarded as the most genial and favorable to the maximum development of mankind. Along this zone the principal cities of the world are grouped. Jedde, Pekin, Bokhara, Constantinople, Rome, Vienna, Paris, London, New York, Philadelphia, Pittsburg, Cincinnati, St. Louis, Chicago, Santa-Fe and San Francisco, and many others, are within this zone. Mount Ararat is in the middle of it. When the westerly limits of the climate zone had been reached by migrating races in the eastern hemisphere, the westward star of empire stood still, and races turned and struggled with each other. Wars, invasions, pestilences and famine became inevitable, when the discovery of America revolutionalized all ideas of progress. The people received a new impulse. The back-ground was withdrawn from the only future they had ever contemplated on earth.

CIVILIZATION.

We cannot say that the sublime sensation of the discovery of this continent had never been enjoyed before; and who shall declare that, in the far off cycles of future ages, it may not be experienced again. Civilization moves like a pendulum through the centuries, forward and backward, accelerated to the culmination of its impulses, then with slackening pace, until it halts and returns to find arts lost, languages forgotten and races extinct.

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We are compelled to believe that a great civilized people occupied this continent previous to the race whose doom is being sealed on the plains to-day by the Americans. The hands of that ancient people raised those mounds we find along the banks of our rivers, and the human bones within them once moved in forms clothed with majesty and power. I have seen on the western slopes of the Rocky Mountains ruined walls of ancient towns, attesting a skill in mechanics of which the present race of Indians are entirely ignorant. In the successive upheavals of that mountain chain, lakes were emptied, and their tilted beds are now arid deserts. The people who gazed on those lakes have vanished like the vapors of their waters. At various places along the back-bone of the continent, from Utah to Peru, are found vestiges of towns, ruins of roads and streets, and strange utensils and implements of war and peace, made of metal and stone. In Peru they tell us of Manco Capac and his wife, who came from some strange country over the sea to found the race of Incas and to teach the Indians how to cultivate the ground and raise food. The customs and manners which they established can scarcely be distinguished from those of remote antiquity in Asia and Africa. Is not the Peruvian story an obscure tradition of some former discovery, or is it their dim legend of Adam and Eve?

Of the ancient people who lived in North America not a trace of their origin, an indication of their destiny, or a scrap of their history is left. Where their agriculture flourished, the Indian has hunted game in pathless woods for centuries. A view of their enduring tombs naturally awakens curious speculations regarding our own destiny, and suggests the question, are we to arrive at the same nothingness?

"O, Nature, how fair is thy face,
And how light is thy heart, and how friendless thy grace
* * * * *
Hast thon never an anguish to heave the heart under
That fair breast of thine, O thou feminine wonder!
For all those—the young, and the fair, and the strong,
Who have loved thee, and lived with thee, gaily and long,
And who now on thy bosom lie dead? And their deeds
And their days are forgotten!
Regrets for thy lost loves concealed from the new,
O thou widow of earth's generations! Go to!
If the sea or the night wind know aught of these things
They do not reveal it. We are not thy kings."

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GEOLOGICAL STRUCTURE OF NORTH AMERICA.

Let us briefly review the geological structure of this continent and the formation of its soil. The Alleghanies and Rocky Mountains were not brought forth from the womb of the primal ocean simultaneously, nor by a single effort. Their summits first appeared above the waters long after the Laurentian range had been fixed, mute but expressive prophets of the future shores of the Atlantic and Pacific. Between these two island ranges rolled a shallow ocean to the Gulf of Mexico, washing and wearing the mountains and hills away, while in its depths vast masses of comminuted rocks and vegetable debris were accumulated.

The mountains rose higher and higher, their slopes extended, and the sea retired by successive efforts. An epoch arrived when one of those efforts would not satisfy the centralizing force which, modifying the shape of the globe, demanded that the poles should approach each other. This was accomplished only by bending the crust latitudinally near the range of the great northern lakes, which were left behind the retiring ocean, and are now from two hundred to eight hundred feet above its level. The central ocean became a gulf, and as it slowly forsook its bed to assume its present limits, broad plains of soil appeared uniting the mountains and completing the continent. The great Mississippi, with its fifty-nine navigable tributaries, drains 1,300,000 square miles—a territory six times larger than France, or equal to all of Europe, except Russia, Norway and Sweden.

TOPOGRAPHY.

There is a remarkable difference between the topographical features of the countries east and west of the Mississippi. To the westward of the States which border the right bank of that river, you may observe on the map a broad expanse almost destitute of rivers. That indicates that there are no mountains, and so the surface is found level and woodless, covered with a short, thick grass, upon which roaming herds of Buffalo subsist. The waters which fall eastward from the Rocky Mountains are almost lost by evaporation in their journey of several hundred miles across the plains. Nature has not finished her work in that region. The Rio Grande, starting at an elevation of 8,000 feet above the sea, avoids the plains by running southward to El Paso, where it breaks through to the gulf. The western slopes of the Rocky Mountains are drained by only three considerable rivers, Columbia, Sacramento and Colorado.

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Between the Mississippi and the Alleghanies, the surface is abundantly diversified with rolling hills, and is consequently well watered. Seventy-five streams of considerable magnitude carry the waters of the eastern Alleghany slopes to the Atlantic. Three of them, the Hudson, Susquehanna and Potomac, have their sources west of the mountains, and break through to the sea. The Potomac is specially remarkable in having no valley of its own, and in violating the usual habits of rivers in breaking through all the mountain ranges in its way, and across all the intervening valleys. The two extreme rivers north and south on our Atlantic coast have the same name, St. John, and are the only ones whose sources are not north of their mouths. The mountains, lakes and rivers of America are the features which modify the climates, express the character of the continent, and indicate the destiny of its inhabitants.

CLIMATES.

In this new world all the climates of the old are reproduced, but within more restricted limits. There is this notable difference resulting from the warmth which the gulf stream conveys to Europe; the heat under the same parallels there average about ten degrees greater than here. The central temperate zone, between forty-seven degrees and thirty-seven degrees north latitude on the eastern coast, exhibits the four seasons with regularity. As you pass south of it, one of the seasons, winter, gradually disappears; northward, spring and autumn are almost lost. The climate of the Pacific coast is peculiar to that region. The currents and winds of the Pacific, with the influence of the Sierra Nevada, change the lines of equal temperature from east and west to north and south, so that fifteen hundred miles of that coast, from Los Angelos to Sitka, have the same summer. The climate of Canada is exceptional. Instead of the damp, chilling cold that is found in the winters of England, we find that season severe, but dry and salubrious.

INTRODUCTION OF LABOR IN AMERICA.

To the shores of America our ancestors brought two distinct forms of society, founded upon two different ideas of human rights, or upon two different conditions of labor. Freed from the shackles of old world society, democratic ideas and principles became calmly and surely established in New England, while further to the southward aristocratic notions and habits were transplanted. The Dutch settlements in New York, and of the Swedes in New Jersey and Delaware, and Huguenots in North Carolina, were exceptionally

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different from the two great social organizations which have overgrown them.

Between those two social forms there was a commuity of interest, and the ties of language, poverty and helplessness.

DEMOCRACY.

The political principles, laws and institutions of one were moulded upon a pure democratic idea; equality of conditions, equal distribution of landed property amongst heirs, recognition of the people's will in public affairs, responsibility of authorities, personal liberty, trial by jury, filial obedience, and public education.

ARISTOCRACY.

In the other, large landed estates were engrossed and entailed, and the basis of a landed aristocracy established, with all its old world habits and characteristics. It is within my memory that a complete knowledge of the interior of this continent has been obtained through adventurous explorations. In the infancy of American society, when its leaders turned their eyes westward, they encountered impenetrable solitudes, which did not disclose a glimpse of the future of the nation yet unborn. During their struggles with the Latin race, with the Aborigines, and lastly with the mother country, the peculiar interests of these two social forms were lost sight of in the absorbing purposes which united the peoples. But once started in the career of independence, the magnitude of the special interest at stake began to be comprehended. Driving the Indian tribes before them, democracy and aristocracy, or free labor and slave labor began the race westward for life and empire. What a peculiar spectacle was then presented to the old world of a struggle between three social conditions here dependent upon the character and condition of agricultural labor, democracy, aristocracy and barbarism—free labor, slave labor and no labor. The frontiers advanced year by year until the Mississippi was reached. Beyond, the track narrowed, and a collision of interest seemed inevitable. The broad region of Texas stretched across the southern track. We acquired it at the expense of a war, and relinquished it to the oligarchy, and barriers were erected to secure us against future collisions. Still advancing, slave labor came to the Rio Grande, when it turned northward and attempted to crowd free labor out of its path. The long postponed struggle for life and death came at last. All barriers and compromises were torn down. One of these two social forms must be broken. Both had

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elements of great strength. The contest was fierce and protracted. It came to pass that the oligarchy was shattered. The strength of its social organization was measured by the force required to crush it—a million men and three thousand million dollars. The strength of the democracy was tested but not measured.

MAXIMILIAN.

A fitting corollary to the problem then solved was the intrusion of the Latin race to thwart the purpose of our war in another quarter, and the subsequent retirement from our shores of those encroaching but baffled hosts. The triumph of the Anglo-Saxon race upon this continent was decided when Wolfe fell on the Plains of Abraham an hundred years ago; the triumph of free labor when the Southern army surrendered two years since.

POLITICAL AND SOCIAL CONDITIONS EXISTING.

Let us consider a moment the political and social conditions now existing in the United States. These considerations may at first appear foreign to this occasion, but when we reflect that our society, government, laws and institutions are founded primarily upon an equality of conditions among men, which can only subsist upon the broad basis of free labor, we must admit their pertinency here.

In the conduct of a war in a republic, the executive power is necessarily strengthened and enlarged to the temporary prejudice of the other co-ordinate branches of the government. When peace returns, the normal necessary equilibrium must be restored; but an equilibrium once disturbed, it is difficult to re-establish. You set an egg on end, and let it go, and before it reaches a state of stable equilibrium on its side, it will rock to and fro many times. In this country, public affairs are controlled by vast crystalizations of men, called political parties. Owing to the brief terms of our principal offices, these parties are constantly arrayed against each other, like opposing nations. When a majority of the people, or the party in power, move any measure *en masse*, such is the momentum they acquire that they seldom stop at the goal they first started for, but are inevitably and almost helplessly carried beyond it. So policies will oscillate for a time, until they settle down to fixed principles. We have no ground for any great disquietude, so long as labor is free in our country. Do you suppose that that sublime fact can ever be changed? Standing upon that, we may dismiss all uneasiness regarding our public debt, and all apprehension of oligarchical elements becoming elevated to power.

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Free labor is strong enough, and possesses sufficient vitality to control our government forever, and pay the public debt sooner than many anticipate.

But it is so very much easie to make mistakes than to rectify them, that we cannot be too careful in making political progress. The sun never shown upon such a portentous and complete triumph as that of free labor in America. Let our appreciation of it, and of the awful power it now holds, be solemnized by the memories of what it has cost the nation.

RECONSTRUCTION.

In the South all the habits, relations and customs of the old society have been destroyed. The entire social structure is like a shattered vase. The question now is, what shall we do with the fragments? We have simply to remould that society upon the basis of free labor—to render it purely democratic. I use the latter word in its proper and not partisan signification. The materials, on the one hand, are somewhat and very naturally intractable; on the other, unprepared. The only remedies are time and immigration. We cannot close our eyes to the fact that the destiny of the freedmen is intertwined with our own. They will never leave this continent so long as it is inhabited by man. They do not naturally belong here, and climate is indomitable, while race is transitory, but it will probably take as long to make them white as it did originally to make them black, and that period is beyond computation. We have given them freedom and civil rights—the responsibilities of free labor will civilize, educate and prepare them in time for their duties as citizens. Last year, three or four millions of freedmen were wandering in quest of one of the chiefest desires of the human heart—a home. The vanquished and disheartened whites could not see through their miseries that they had been saved and blessed in the overthrow of their society, and did not know where or how to work. Consequently, in all the South, labor was but fragmentarily performed, and the result was a fragmentary crop, But homes have been found for the freed men; and many of the leading whites, the former privileged class of the South, with a forethought that does them credit, have gone to work at occupations they would formerly have considered degrading. They have been converted; and the purposes of the war, so far as they are concerned, are satisfied. They who shall perform the labor at the South will eventually possess the land,

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and will enjoy the privileges and exercise the powers which are attached to such possession. The Southern States should at once organize immigration societies, like that of Wisconsin, and send forth their agents to bring to them Celtic and German elements, both foreign and domestic. The first element of wealth is population, because of the labor that may be performed. Let them increase their population. The Celt and German will resist the modifications of climate longer than any other races. Free labor will reconstruct that society in spite of ambitious or contumacious politicians. We should not forget, however, that it is our imperative duty to help the helpless, and respect those who are honestly endeavoring to help themselves. Those who are so obstinately blind as not to see and understand the logic of events must not expect any consideration.

INDIANS.

Regarding the Indians, there are but two courses left to us: we must either civilize or destroy them. Most of them will die in their present condition. Both plans have been tried with success. Agricultural labor fixes the Indian—deprives him of his wandering habits and nomadic tastes. The Cherokees and Chickasaws have been given the Indian territory, west of Arkansas, the most beautiful tract of land on this continent, and civilization is well advanced among them, in spite of the retarding influence of slave labor which recently existed. The Choctaws and Creeks have likewise been settled. The powerful and warlike tribe of Navajoes have recently been gathered and settled in like manner in New Mexico, with the same promising results. The pure nomads, the Camanches, Apaches, Cheyennes, Kiowas and Sioux, and others, will resist until their weakened remnants are no longer able to make war, when they may consent to labor.

NATIONAL PROGRESS.

In the progress of this nation there is so much that is new and extraordinary, we may believe that God will permit our attention to be withdrawn from the intellectual miseries which harass and destroy other nations. There must be for us a calm, certain and grand future, where the highest development of civilization, happiness and prosperity shall be attained. Our forefathers came to these shores with the accumulated experience and instructions of fifty centuries, yet what is there in the constitution of our government, the operation of our laws, the freedom of our religious

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worship, our means of public instruction, in our agricultural habits and methods, that can be referred to any other nation as a model?

Our newspapers, filled with the news of the world, start from every eastern city and town on the wings of the morning and fly beyond the Alleghanies, where they meet a returning flight from the valley of the Great West. The welkin rings with the echoes which resound from thirty-six thousand miles of railways, burdened with moving millions and their traffic. Our labor-saving machines arrest the attention of emperors, and awaken the wonder and admiration of the world. Our agriculture has, during the last fifty years, above all other industries, illustrated the exceptional character of this nation and its progress.

PROSPECTS.

The invention of labor-saving machines, and the discovery of new and useful truths in chemistry, applicable to agriculture, characterize this unparalleled era. Fond of experiments, and untrammeled by habit, we are advancing to a highly scientific agriculture, which shall more than double the productive powers of our soils. We shall learn how to create artificial climates by controlling the action of the sun and atmosphere, and how to replenish the soil by restoring the vital forces which are annually withdrawn from it. With a perfected agriculture, we shall have cheaper food, clothing and lodging; manufactures will be encouraged; labor and raw material becoming cheaper, commerce will flourish, and we shall have more time for education and travel.

NATIVE WINE.

And here I must not fail to congratulate you especially upon the growth of an interest in this county, the importance of which cannot be over-estimated. I allude to the grape and wine production. In ten years you have brought it from nothing to its present promising condition. With 4,000 acres of vineyards, and the largest vaults east of the Mississippi, you cannot lose the first position which you have attained.

Native wines will vanquish strong drink in time. It is the greatest temperance movement ever made in this country. Whenever pure wine shall become abundant and cheap, intemperance will hide its terrible face.

ELEMENTS OF UNION AND DISUNION.

The highest hope of the American people is an enduring nationality, based upon a perpetual union. The various elements

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of union are a federal constitution, free labor, education, the centralizing influences of our mountains, rivers and soil, and the material effects of our railroads and telegraphs. The elements of disunion are diversity of climates, ignorance and prejudice.

The strength of the federal constitution depends upon the profound respect and veneration entertained for it in the hearts of the people; its conservation upon the majestic repose of a nation's trust. The considerations which suggest any change in the constitution should embrace in their scope every blessing of the past and all the difficulties of the present. Every new word should be weighed in a mental balance, so lofty as to be illuminated by the unrisen sun of the next century.

Though labor be free, yet in order to reap all its fruits it must be wisely directed and judiciously protected. A man who labors twelve hours in every twenty-four must devote the remainder to eating and sleeping; while intelligent labor, requiring at least one-twelfth of the day for reading and instruction, will, in the aggregate, take away about one month in a year, which, without protection, will subject him to be undersold by the first. We must either abandon the education of labor or protect it.

VERMONT THE RICHEST STATE PER CAPITA.

In determining the character and direction of our industries, we must carefully study nature and look to the future guided by the experience of the past and the indications of the present. If we were asked which was the richest State *per capita*, we would probably first think of Rhode Island, with her workshops, but I believe the last census showed that Vermont was entitled to that distinction, and there is no individual in the State worth above a million dollars. *And her industry is purely agricultural.* Cultivating six hundred thousand acres more than any other New England State, she has bred the best horses in this country, and is now breeding the finest sheep in the world. Two-thirds of all the Infantado blood known is owned in Vermont. By careful breeding her farmers raised the weight of a fleece from seven pounds to thirty-one. She furnishes a splendid illustration of the powers of free labor through scientific agriculture, in acquiring and distributing wealth, and of the advantages of studying nature, adapting our industry to her requirements. But agriculture, however perfect, would be powerless to promote happiness were not its labor free. The lands about the city of Rome are not so well cultivated to-day

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under the Pope, as they were under the Romans, when men were driven to the field in chains; but I apprehend the people are happier now than then. The returns from the other New England States do not show an increased aggregate of agricultural productions, although the cultivated areas have been increasing. The growing demands of their manufactures have not only diminished the amount of agricultural labor, but have induced and absorbed immigration.

NEW YORK.

New York, not forgetting her agricultural advantages nor her manufacturing facilities, should better understand that her peculiar position makes her the great carrier between the east and the west.

No seaport town has remained over two hundred years the commercial centre of any nation. London, in spite of the Cinque Ports, and all others, is the monetary centre of England, and of the world. "Paris is France," Brussels Vienna, Madrid, Florence, Frankfort, are all inland.

FUTURE.

When fifty millions of people have settled down upon the tributaries of the Mississippi, as the birds settle upon the branches of a great tree, what will be their necessities and demands? Control of the continent, and an easy access to the Atlantic, Pacific and the Gulf. Whoever opens those gates will take toll of the raw products of that exclusively agricultural region distributed to the world, and of manufactured articles returned to that immense valley. New York, with her canals and railroads, which ought, perhaps, to belong entirely to the State, possesses exceptional advantages of which no one can deprive her, although she will have an energetic rival in Canada, who, during half the year, by connecting the Georgian Bay with the Ottawa and St. Lawrence, may shorten the water line from the greatest grain depot of the world, Chicago, to the Atlantic by 300 miles. Canada will have the influence of her own returning products to aid her in opening her communications. Her lumber will be demanded by the great woodless prairies. And Michigan, with a canal cut across her southern frontier, will ask a share of the carrying trade. The Union Pacific railroad, most happily named, will, for a time, satisfy the western commercial demands, but must soon have a branch down the Snake river into Oregon, and one down the Rio Grande to Mexico.

To oppose the persistent modifications of climate which give birth to antagonisms between different sections of the republic,

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we shall have a magnificent system of railroads and telegraphs which will mingle the people, improve their manners and harmonize their intelligence. To combat the hideous monster, ignorance, we must establish a powerful and thorough national system of education, organized as a branch of the government, with a secretary in the cabinet. Graduates of the same college are apt to think alike; the thoughts and opinions of a nation uniformly and thoroughly educated would probably harmonize. Crime generally born of ignorance or defective education, would be lessened, and idleness, who lives next door to crime, would have to move.

CRIME.

Not long since I went to see the monument of Wolfe, at Quebec. The granite said, "Here fell Wolfe, victorious," and my coachman, pointing with his whip, added, "Here is the new jail." I reflected, is this the fruit of the triumph of the Anglo-Saxon? O Americans, if there be sermons in stones, listen to the imprisoned murmurings of breaking hearts, and the sad complainings of cramped intellects, which reach your ears through dungeon walls. Which is most culpable, they or you? Have they not simply perpetrated the crimes which you have permitted to exist?

Cannot the genius which sends the ocean steamer over an appointed track, and drives the reaping machine through our waving fields, devise some means by which the ignorant, shiftless, filthy vagabonds who infest our cities may be carried out upon the yearning bosom of nature, where the grass grows, flowers bloom, trees blossom and bees hum? Would not agriculture and mental and moral culture lift those dreadful social burdens from poverty and misery, and render them productive of profit and happiness? Their lives are now but promissory notes to be redeemed in prison.

And cannot a charity which protects animals from cruelty originate some measure by which the industry of needy women and children shall be protected and rendered honorable and profitable? The conclusion of the whole matter of life and labor is this: to conquer nature, both human and physical, to subdue the earth, we must study all the forces with which we have to contend, and control them. We cannot eradicate selfishness, vanity, pride and ambition from human nature, but it is possible to turn them to good account. It may be denied to us ever to know anything in this world of the nature of physical forces, although familiar with their efforts, but we may continue to discover new methods for controlling and applying them to useful purposes. Go out on the prairie and

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see the Indian broiling his game over a small fire, and then return and look at the smoke which hovers over our countless industries, and you will realize the progress that has been made in the application of heat. When we shall have devised economical means of applying it to the soil, we shall witness the most amazing results. The science which investigates, and the art which controls many forces are yet in their infancy. We have just begun to use electricity. And there are subtle forces which have, as yet, eluded control. Some day they will feel the mastering grasp of a human hand.

The difference between our intellectual and material progress is marked. Our poetry is fragmentary, our music foreign, in painting we can boast only of our landscapes, and a few historical pictures, our sculptors are abroad, and our architecture is all borrowed; even our log houses came from Norway. But our material progress is original. So will be our triumph.

SUFFOLK.

The county fair opened at Greenport under favorable auspices, and if a great crowd of people upon the grounds, a superior display in all the leading lines of industrial, mechanical, or natural productions, and large receipts into the treasury of the Society, be thought to constitute success, then the exhibition may, without exaggeration, be pronounced eminently successful.

The grounds selected for the fair lie a short half-mile from the village, situated upon the north side of the lower Southold road, and consist of three beautiful level lots, belonging to Mr. Jeremiah Moore. Out of these some sixteen acres were inclosed by a tight board fence, seven feet high, and on the eastern side, nearest Greenport, a half-mile track had been laid out and graded until it was in very good condition for the display of speed by horses, especially for so short a time as was allotted to its preparation.

On the western side of the grounds were erected the show building, 200 feet long, boarded up at the north end, for the display of all such articles as required to be put under cover. Along the south side of the west lot were ranged the agricultural implements, etc., and against the west line of fence, stalls were

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built for cattle and horses, the poultry occupying platforms running north from the southwest corner.

On Wednesday the attendance was comparatively small, though the entries of articles for exhibition made on that day and the the evening of Tuesday far outnumbered those of any previous fair.

The business meeting took place at the Baptist church, on Thursday evening, in the presence of a large and attentive audience. Hon. Samuel A. Smith, of Smithtown, was introduced as the orator of the occasion, and proceeded to deliver an address marked by practical good sense and enforced by a vigorous treatment of familiar current topics bearing upon the rights, the interests, or the relations of the agricultural class in Suffolk county—a plain, unpretending, yet most instructive and valuable address, which pleased the audience greatly and was heartily applauded. A vote of thanks was tendered him at its close, and a copy was requested for publication.

On Friday the trotting matches took place. A large number of people that had designed to be present from all parts of the county were deterred from coming by the bad state of the weather, but there was still a great crowd in attendance throughout the day.

Officers for the year 1868: President, Dr. B. D. Carpenter, of Cutchogue; Treasurer, Wm. J. Weeks, of Yaphank; Secretary, James H. Doxsee, of Islip.

The following shows the financial condition of the Society:

RECEIPTS.

Jan. 1867—Cash balance on hand		$242 65
Receipts at fair		1,886 90
Life memberships		150 00
Other receipts		302 47
		$2,582 02

DISBURSEMENTS.

Expenses for 1866	$205 00	
Premiums paid	729 25	
Expenses	1,115 75	
Cash in treasury	532 05	
		$2,582 02

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TIOGA.

The annual fair of the Tioga County Agricultural Society was held at Owego, on the 1st, 2d and 3d of October, 1867. The first day was devoted to making entries. The second day the articles on exhibition were examined by the several committees. The third day to trying the speed of trotting horses, and to the reports of committees.

The exhibition of cattle was not all that could be desired. The farmers are determined that the next fair shall be a vast improvement in this respect.

The show of sheep would compare favorably with any other county, being of all grades and kinds of long, middling and fine wool.

A very good show of fruit, with a better display of agricultural and mechanical implements, manufactured at the Bristol iron works, in our own village.

The exhibition of dairy products, excellent; in fact, surprised everybody.

Floral hall was filled, and tastefully arranged, under the superintendent, Andrew Coburn, Esq., with a staff of valuable lady assistants. Great credit is due to the exhibitors in this department for the taste skill and variety of articles.

The weather was delightful, and the fair a success. One more such will relieve the Society from its embarrassments.

Receipts	$1,200 00
Expenditures	1,150 00

Officers: President, N. K. Warring, Tioga; Secretary, H. N. Greene, Owego; Treasurer, D. I. Bloodgood, Owego.

H. N. GREENE, *Secretary.*

TOMPKINS.

The twenty-seventh annual fair of the Tompkins County Agricultural and Horticultural Society was held on their fair grounds in Ithaca, on the 26th, 27th and 28th days of September, 1867.

The first day was devoted to entries of agricultural implements, domestic manufactures, fruits, flowers, vegetables, &c., and the display in each department was creditable and the building was well filled with productions of the farm and the shop.

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On the second day all kinds of stock were entered and shown for the Society's premiums.

The show of horses was good, both for carriage and draught, and fully met the expectations of the Society's friends in attendance.

The show of cattle was fully up to the average of our exhibitions, and was evidence of a marked improvement in character, chiefly owing to the interest in such matters commenced years ago by the Hon. Ezra Cornell, and pursued with untiring energy, for which he deserves the thanks and gratitude, particularly of the farmers of Tompkins county. The show of sheep and swine was good.

There was a good display of fruits, and vegetables; and the dairy products, as represented by the specimens on exhibition, were evidence of a steady improvement in that important department of agriculture.

The articles exhibited in the fancy department were very fine. The women, as usual, contributed generously to the display, and the large hall was well decorated and filled.

The receipts for the fair were	$1,427 88
The expenses	300 58
And the premiums awarded and paid	800 00

At the annual meeting in January, 1868, J. Albright, of Dryden, was elected President; N. Crittenden, of Ithaca, Secretary; O. B. Curran, Treasurer, and a vice-president for each town.

O. B. CURRAN, *Treasurer.*

ULSTER.

KINGSTON, *January* 25, 1868.

The president, secretary and treasurer of the Ulster County Agricultural Society, in pursuance of chapter 425 of the Laws of 1855, make the following report to the Secretary of the State Agricultural Society:

That in pursuance of an act of the Legislature of the State of New York passed April 16, 1867, entitled "An act to organize the Ulster County Agricultural Society into a stock company," a meeting of the old life members of the Society was held in Kingston, on the 6th of June, 1867, and a stock company organized under said act.

The following officers were elected: President, William Master;

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Vice-President, Henry L. Van Etten; Secretary, William Lounsbery; Treasurer, Cornelius Burhans.

The annual fair of the Society was held on the 25th, 26th, 27th and 28th days of September, 1867, at which there was received the sum of $1,768.90.

The Society now owns fourteen acres of ground dedicated to the use of the Society, upon which there are erected substantial and convenient buildings, at an estimated cost of $7,500.

FINANCES.

Receipts	$5,325 28
Disbursements	6,360 51
Due treasurer	$1,035 23

The annual address was delivered by Seymour L. Stebbins, Esq., of Rondout.

At the annual meeting of the stockholders of the Society, held at Kingston, on the 15th day of January, 1868, the following officers were elected for the ensuing year: President, James Kiersted; Recording Secretary, William Lounsbery; Corresponding Secretary, F. L. Westbrook; Treasurer, Cornelius Burhans.

All of which is respectfully submitted.

JAMES KIERSTED, *President.*

WILLIAM LOUNSBERY, *Secretary.*
CORNELIUS BURHANS, *Treasurer.*

Address

BY SEYMOUR L. STEBBINS, ESQ., OF RONDOUT.

Mr. President, Ladies and Gentlemen:

Every art or pursuit has its practical details, which its own adepts and followers are alone competent to expound and illustrate; and until men shall gather grapes of thorns, and figs of thistles, it cannot be justly assumed or imagined that any have plucked from the brambles of the law the fruit of the tree of other knowledge. But underlying all apparent diversity, there are principles of unity binding together the great family of man, and every vocation has its relations near or remote to every other, its bearing on the welfare of the race, and may, in its general aspects, fitly be the subject of thought or the theme of discourse by those of other occupations; and more especially is this true of that calling without which all others were impossible; whose mere cessation would more swiftly depopulate the earth than all the battles that ever crimsoned its fields or stained its waters; which brightens every habitable zone, and

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throughout recorded time from primeval ages to the present hour, has kept the promise that seed time and harvest shall not cease.

In this mellow autumn, on this broad plain of Ulster, bordered by our noble river, sentineled by our western mountains; at this festival of the farmer, where the pride of flocks and herds, the selected fruits of farm and garden, the implements of industry, the products of related labor and art, the tasteful fabrics wrought by the skillful hands of the housewife, are gathered and displayed; in this hall of flowers, arranged by matrons and maidens, themselves fairer flowers, where nature's blooms are made to reveal new beauties by contrast and combination; here where come the men to whose dominion valley and plain and hillside pay ample tribute, the producers of wealth and plenty, and the sure reliance of the State, it is meet that some thoughts, however inadequate, of them and their calling, should find expression, however brief and imperfect the utterance.

While there have been, and may yet be, temporary collisions of interests, we have good reason to believe that on a large scale and in any considerable course of time, the true interests of all coincide; and as this truth becomes more fully appreciated, and the relations of varied industry are better adjusted, it is to be hoped there will be only such antagonism as shall spur the faculties of man into wholesome action, and evoke the mighty energies of labor to healthful exercise, evolving larger concord, as the partial discords of some great master-piece of music conduce to a grander harmony; and that there will be recognized an essential identity of the diversified activities of man, as the ocean, with all its diverse currents and contending waves, its ceaseless ebb and flow preserving its purity, still has a unity so absolute, such an interdependence of all its parts, that as an eminent mathematician has demonstrated, the slightest impulse that affects it anywhere is diffused through every drop in its immeasurable bulk, and reaches its most distant shores.

So many agencies combine in the work of human advancement that we may not claim for any the exclusive praise; but in any just distribution of rewards and honors to the benefactors of the race, the agriculturist must receive the best testimonial and the highest premium. But for him, the tense muscles which delve the mine would shrink and fail; the hammer and the anvil would no longer ring out their iron music; the marts of trade would be deserted; the pennons of commerce would be playthings of the wind, idly waving over rotting hulks; the useless light house would no more

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emit its warning ray; the right hand of the artizan would forget its cunning; the temples of science and the monuments of human achievement would crumble, and there would exist but a scanty and miserable remnant of the race to which God gave dominion over all the earth and all its habitants.

It is only of late years that history has found its proper methods; the approximately full and true account and narrative of man's past condition and progress are yet to be written. An adequate history of agriculture would be of more value than that of all the potentates and oligarchies which ever made the toiling millions tributary to the favored few. What an account would that be of the rude beginnings of industry; of simple and imperfect plans and contrivances; of many and repeated failures; of necessity stimulating exertion and awakening the practical reason and the inventive faculty; of gradually improving methods and appliances; of constant struggles with nature; of wider and wider regions won from their primitive wildness; of productive peace repairing the waste of war; of the Atlantean shoulders of labor upholding the world, that stage on which the demi-gods of fame enacted the dramas whose shadowy semblance pictured on the pages of the annalist too often excludes or conceals the realities which should be reproduced there; of fruitful toil making the earth habitable for its increasing millions, and in spite of unwise and oppressive burdens and restrictions, feeding more than a hundred generations of men; and, above all, of the gradual elevation of the masses of humanity.

In such a history the record of the achievements of the American farmer would constitute the brightest pages. He had all the difficulties of his remotest ancestors to encounter; he had, like them, a new world to subdue; but he brought to the task a more resolute and persistent spirit and the resources of a higher development. No augury presaged the greatness of the State he would found, but when he set his foot upon the shores of this hemisphere, the continent received its master; the forest receded before him; the savage vainly sought to stay his advance; as the wise men of the East followed the Star of the Nativity, so he followed the Star of Empire on its westward way, and now over all this vast and constantly enlarging area of freedom and plenty there lies spread out beneath the smiling heavens the magnificent result of his energy and his faith.

But he has done more than gather the harvests where the earth

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was liberal and her valleys and plains rich and bounteous; more than fructify the sterile soil, more than reclaim the marsh and the wilderness, more than develop in a great degree the resources of half a continent; he has promoted the education of his sons and his daughters; he has fostered a spirit of patriotism and independence and of resistance to arbitrary rule. It is mainly to the farmers of America that we owe our existence as a nation; it was their virtues, their fortitude and valor, cultivated by their occupation and the circumstances in which they were placed, which made them the effective instruments in breaking the yoke of a foreign power; and it was their great leader, the ever-honored Father of his Country, who, after his public life, found in the management of his farm or plantation ample occupation for the mind which had led the armies of freedom to victory and had worthily performed the highest civil duties. And they have since done their full share in preserving this goodly heritage. To recount their deeds would be, in a large measure, to repeat the history of the country.

In their pursuit and what relates to it, much has been done, and well done, but as we may shortly discuss, more and better remains to do.

The American farmer, then, is of the nobility of the nation. In tracing his lineage back to colonial days and to other lands, and through by-gone centuries, we find many illustrious names; but everything human is imperfect, and if we go far enough we make the shocking discovery that the first tiller of the ground was Cain; but there is no reason for special sensitiveness on this score, for unless both history and tradition lie with uncommon profusion and vigor, this is not the only instance of a noble line which has an unfortunate kink in it; and going back a little further, we find that the founder of the house was a respectable gentleman named Adam, largely engaged in gardening, whose son Abel, a keeper of sheep, was noted for the piety of his disposition and the excellence of his stock, and has always been considered a credit to the family.

It is here in the western world that agriculture is destined first to attain its nearest approach to perfection; some of the more important implements here used already surpass those of an older civilization, as has recently been made apparent at the Paris Exposition. When we recall how every past improvement has encountered prejudice and opposition, but has surely though slowly made its way; when we note how extensively better appliances of culti-

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vation have been adopted—we have reason to believe that the day is not distant when practice and theory will walk hand in hand, each aiding the other. Agriculture lent to science the means of its existence, and science is repaying the debt. Never has such rapid progress been made as during the present century, and each advance seems to prepare the way for others; acute observation, careful experiment and extensive induction continually disclose hitherto unknown or imperfectly understood facts and laws of nature—a higher point of view is attained, overlooking new fields of discovery. Improved and thorough cultivation will more than double the productiveness of the regions already occupied. What has been done on a small, may yet be done on a large scale.

Habit and routine may delay this consummation; and it is not to be denied that sometimes the unsuccessful attempts of visionaries and the swindling devices of peripatetic plunderers have given apparently good reason for distrust of new things; but every State institution devoted wholly or in part to agriculture, and every county society, may test whatever is claimed to be an improvement, and thus, without risk to individuals, observe the apostolic injunction: "Prove all things; hold fast that which is good."

It is the combination of practice and theory which is advocated. The man of experience must succeed better than the mere theorist; but either may help the other. Impart to the practical man the knowledge which science unfolds, and you put new implements of success in his hands; give to the man of science the results of experience, and you furnish him with the means of testing and extending his conclusions, though sometimes he may get a special fact that will puzzle him to use. It is related of Sir Isaac Newton that once when out walking he met a shepherd, who told him he had better return home, as it was going to rain. The sky being clear, the philosopher paid no attention to the warning, and a sudden shower coming on, he was drenched to the skin. Ever eager in the pursuit of knowledge, he sought the shepherd the next day to learn the meteorological sign, of whose truth he had received such uncomfortable evidence. "Sir," said the shepherd, pointing to the patriarch of his flock, "whenever I see that old ram turn his tail to the wind, I know it is going to rain!" The discoverer of the law of gravitation had acquired a new fact; it was a thing not dreamed of in his philosophy.

Abundant production will reduce the prices of our agricultural staples, but unless the laws of political economy are misunderstood,

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this, while benefiting others, will be no detriment to the farmer. There may be temporary exceptions arising from artificial combinations or the irregular movements attending a period of transition; but the prices of essential articles of food necessarily affect the prices of all other commodities. During a period of waste and destruction and relatively diminished production, the farmer has received high prices, but he has also had to pay high prices for everything, If the prices of his products fall, those of other things will fall in like ratio, and he will probably save more than before.

The necessary burdens of the government are heavy, but the degree in which they are felt depends not upon the absolute magnitude of our State and national debts, but upon their magnitude as compared with the total wealth of the State and nation. If you double that wealth, the rate of taxation being unchanged, you will pay those debts in half the time that would be required for that purpose if the amount and value of property should remain the same. If you double that wealth and raise no more taxes than now, the rate of taxation will be reduced one-half. By so much as production exceeds consumption is the total wealth increased; our population is rapidly augmenting; the efficiency of the producer is becoming greater; and every one who runs the furrow through lands untilled before, every one who enhances the fruitfulness of our older fields, is lightening the burdens of debt and taxation. Like Antæus of classic fable, the nation receives fresh strength whenever it touches the ground. To discharge its obligations with comparative facility, it does not want new greenbacked representatives of value, but new intrinsic values now locked up in the great treasury of the soil. Science will furnish the key to unlock that treasury, and the honorable earth will not repudiate.

The importance of education to the farmer cannot be over estimated. In his occupation he has practical need of the results, if not the processes, of the highest scientific culture. Many things of great value as fertilizers were wasted through ignorance, and that waste, though diminished, still continues. Growing knowledge will economize the elements of productiveness; supply the deficiencies of soils; secure the proper adaptation and rotation of crops; furnish weapons wherewith to fight the armies of insect foes; compensate for the occasional unpropitiousness of the seasons; and forewarn of the drouth, the frost and the storm. Books were once written treating of the influence of nature upon man; books are

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now written concerning the influence of man upon nature; the West furnishes abundant illustration of the changes man has wrought.

There is enough to be learned, connected with the vocation of the farmer, to engross the most eager and enquiring mind; and if his business be made not merely a matter of routine, but a subject of study and thought, it will be rendered more attractive and more profitable, and his sons will take interest and pleasure in its pursuit. It should be taught in our institutions of learning, and it is gratifying to observe that there are strong movements to that end, the most important of which gives us the Cornell University at Ithaca, one of whose main objects is thorough education in the science and practice of agriculture, and which starts with an endowment of a million acres of land and three-quarters of a million dollars. It is not possible that every one should be taught all kinds of learning, and it is not necessary, for there is many a successful manager of a dairy who, though unacquainted with Herschel and La Place, knows more than they ever knew about the *milky whey;* but every one should receive a good general education, and special instruction in what relates to his occupation. When the laws of meteorology are more fully understood, the farmer will not always have to ask the man in the moon for information on the subject of the weather, and the housewife will not be so often looking at that lunar gentleman, but will keep her glances and her thoughts at home, where they belong.

While we must condemn that agrarianism which would parcel out the accumulations of the industrious and prudent, to be squandered by the idle and improvident, we must also hold that a state of society where immense wealth is held by a small class, and grinding poverty is the lot of the masses—such a state as that of France before its terrible but salutary revolution—to be unnatural and unjust. Where all have equal rights, the opportunities of education, and a fair chance, we may expect such a distribution of property that few will suffer, unless through their own faults or by exceptional misfortune. The greater the number of those possessed of a reasonable competence, other things being equal, the greater the happiness and stability of society. The multiplication of labor-saving machines and more abundant production promise to diminish the toils, enlarge the comforts, and better the condition of all.

Man is so compounded of good and evil—there have been such retrogressions,—that sometimes there will intrude a saddening

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doubt of his progress; but modern investigations show that there has been a substantial and general improvement in the physical as well as in the moral and intellectual state of men since the most favorable days of "the good old times." With all its turns and windings, the long path has had a general direction forward, and will lead to a golden future. As the silent forces of nature through great periods of time have slowly lifted the shores of continents above the seas that once covered them, so the millions of humanity, impelled by the nobler energies of their being have risen and are still rising above the floods of ignorance and oppression which once rolled over them, to stand on the sacred soil of liberty in the sunlight of truth.

WARREN

B. P. JOHNSON, Esq., *Secretary of New York State Agricultural Society:*

DEAR SIR—At the annual meeting of the Warren County Agricultural Society, held on the 7th of January, 1868, the following officers were elected for the ensuing year:

President, Henry Griffing, of Warrensburgh; Corresponding Secretary, William H. St. John, of Luzerne; Recording Secretary, E. W. Hunt, of Glen's Falls; Treasurer, Morgan Burdick, of Luzerne.

MORGAN BURDICK, *Treasurer*

WASHINGTON.

B. P. JOHNSON, Esq., *Secretary New York State Agricultural Society:*

The annual meeting of the Washington County Agricultural Society was held at Mott's Hall, Fort Edward, December 10, 1867.

The meeting was called to order by the president, S. W. Crosby.

The minutes of the last meeting were read and approved.

Mr. Ingalsbe, chairman of the auditing committee, reported that they had examined the treasurer's report, books and vouchers, and found them correct.

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On motion, the treasurer's report was read and adopted, which is as follows:

Balance on hand, Jan. 8, 1867	$458 13	
Received during the year	2,356 29	
		$2,814 42
Less life membership fund	$130 00	
Outstanding liabilities	81 00	
		211 00
		$2,603 42
Paid premiums and expenses during the year		1,673 06
		$930 36
Premiums and expenses of winter meeting		93 00
Available balance in treasury		$837 36

Officers elected for 1868: President, John M. Williams, Salem; Recording Secretary, R. W. Pratt, Fort Edward; Treasurer, Wm. M. Holmes, Greenwich; Corresponding Secretary, M. Ingalsbe, South Hartford.

WAYNE.

B. P. JOHNSON, Esq., *Secretary of the New York State Agricultural Society:*

DEAR SIR—At the annual meeting held in Lyons, February 1, 1868, the following officers for the current year were duly elected: James M. Bradley, President; W. D. Perrine, Treasurer; John L. Cole, Secretary.

The following will show the financial condition of the Society:

1867, Jan. 1.—To balance cash on hand	$330 13
Receipts for the year 1867	491 25
Due treasurer	20 49
	$841 87
1868, Jan. 1.—By disbursements, as per treasurer's report in detail, enclosed herewith	841 87

The following, relative to the apple crop, was kindly furnished by E. Ware Sylvester, Esq., of this place.

CHARLES DEMMON, *Secretary.*

APPLE CROP.

The productions of another year only tend to establish the fact that the "home" of the apple in the United States is located in the four counties bordering on Lake Ontario, commencing at the

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east line of Wayne county and extending through Wayne, Monroe, Orleans and Niagara. Although this is a limited extent of territory, yet it is perfectly evident to any one who will examine the markets that more than one-half of the apples sold in our large cities are grown in these counties. From the records of shipments this fall it is plainly evident that the money value of the apple crop sold by the four counties, if you estimate the apples at three dollars per barrel, is fully two millions of dollars for the green apples sold. Now, if you add for apples consumed at home—cider made and apples dried—only one-fourth of this amount, you will have a grand total of two and a half millions as the value of the apple crop in the four counties above named.

Other portions of the United States produce apples in considerable quantities; for instance, some portions of Michigan, southern Illinois, portions of Ohio and New York along Lake Erie, and some of the counties bordering the smaller lakes. But if you inquire of the wholesale dealers where the apples which are long keepers come from, you will always receive one answer, "from Western New York." Indeed, the dealers base their calculations of prices upon the fact that the great bulk of apples from any and all sections of the country except Western New York, will be out of the market by the middle of January, either sold or decayed; so that the market from this time until summer will be supplied almost entirely from the four lake counties of New York already named.

What is the cause of this superiority in point of productiveness and long keeping? We answer that it is not one cause alone, but the combination of three causes, soil, latitude and water or lake influence. The soil, in most portions of the four counties named, seems to favor the healthy growth of apple trees, whether young or old. That latitude and lake influence combined form the *climate* which just suits the apple, and here it puts forth its best efforts, and seems to feel perfectly at "home;" and in the golden autumn, the pendant branches, laden with luscious fruit, welcome you to a repast worthy of "nature's noblemen."

In portions of Michigan we have similar lake influence, but the soil is different, and the trees, young and old, do not seem to possess the same constitutional vigor as they do here. In parts of southern Illinois, sometimes called Egypt, we have, in many parts, similar soil, but a few degrees of latitude make a great difference in solar heat; hence, the apples have already commenced the fermentation which precedes decay, when they are gathered.

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With these facts before us, is it not for the pecuniary interest of the farmers of Wayne to most carefully guard the apple interest? To see that the trees are carefully pruned, and kept free from worms, the soil well cultivated by hogs, and additions of lime and suitable fertilizers made to the soil when needed?

We trust that farmers will soon see the necessity of paying more attention to a crop which pays fully a hundred dollars per acre annually, on an average, while two, three or four hundred dollars are sometimes brought to the farmer's pocket by the yield of a single season from a single acre of apple orchard, well attended.

WESTCHESTER.

The twenty-third annual fair of the Society of Agriculture and Horticulture of Westchester county, was held on the 24th, 25th, 26th and 27th days of September, 1867. The grounds had been enlarged since the previous fair, by an addition of nearly eleven acres, at a cost of $3,626. The enlargement necessitated changes of fences and other alterations, which, with the construction of a half mile track, involved a further outlay of nearly $3,000.

Our farmers have not contributed of the products of their fields as they should have done; neither have they presented anything very superior or novel in their cultivation. They appear to be wanting in that pride of professsion, the "*esprit du corps*," as it may be called, and that generous rivalry which ought to stimulate them to surpass in every branch of husbandry.

It is true that a few have shown this spirit, and clearly proved that Westchester county is capable of producing as fine fruits, cereals and roots, and as large a yield, as any county in the State. But these proofs were the exceptions, not the rule, among the farmers, as will be seen by referring to the records of the Society. The entries of field crops for the last ten or twelve years show an annual average of only ten; and of that small number, a portion always failed of receiving premiums, by neglecting to furnish certificates of quantity of crop and mode of cultivation. The improvement in the entries of 1866 has not been maintained, nor has the hope expressed in the report for that year, that "it was the forerunner of better things, and that a department which gives the leading title to the Society will be sustained in a manner creditable to the county," been realized. The competitors this year num-

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bered only six, and of these, but one took premiums. This supineness in a county immediately adjoining the metropolis of the State, abounding in wealth and intelligence, and possessing every local advantage, is certainly to be deplored. It is earnestly to be hoped that our farmers will shake off their lethargy, and whatever their speciality may be—horse, stock, fruit or field crops—contribute liberally to our annual exhibitions, and make them what they ought to be, the very best in the State.

There was an increase in the entries of horses of twenty-five per cent over those of last year, and the animals were of great beauty and almost fabulous value. Their performance on the track excited the admiration of a vast crowd of spectators, and could be surpassed by but few horses in the State. The management of the track was not all that could be desired, and showed the necessity of restricting its use, with but few exceptions, to those only who enter their horses for premiums.

The entries of neat cattle of all classes, Alderneys excepted, were about the same as those of last year. In Alderneys, they were more than doubled, and the animals were of the very highest order. It was suggested by a gentleman of large experience, and an excellent judge of this kind of stock, that the Channel cattle be classed as "Guernseys" and "Jerseys." He says: "They are very distinct breeds, and many are keeping them distinct. He adds: "We are getting some of the finest Channel cattle in the world in Westchester county, and if my life is spared, I will try to get them together next fall."

The entries of sheep were the same in number as last year, varied by a single Leicester, all the rest being Southdowns.

In swine, there was a great falling off in numbers, but not in merit. The same may be said of poultry, dairy products, vegetables and fruits. In the last department, the exhibition was very fine, and notwithstanding a very unfavorable season, the specimens were fully equal to any shown at former fairs. What is said of fruit, may be said of flowers. The gladiolas of T. Ryan, of Yonkers, were of many varieties, and surpassingly beautiful. There was a great increase in the entries of mechanics' work and agricultural implements. In the former were carriages of various descriptions, sleighs, harness, self-opening and shutting gates, &c. In the latter, combined seed sower and cultivators, self-raking reaper and mower, thrashing machines, fanning mills, feed cutters, hay rakes, &c. Messrs. Reisig & Hexamer, of New Castle, exhibited their patent

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adjustable hoe, an excellent implement for garden or field purposes. The department of household and domestic manufactures was rich in specimens of taste and skill. To the fair contributors, the Society is indebted for the most beautiful and attractive feature of the exhibition.

The Rev. Dr. Hulburt, pastor of the Reformed Church of White Plains, delivered an excellent address, which was highly appreciated, and a vote of thanks tendered the speaker, with a request that he would furnish a copy for publication. The reverend gentleman declined, as he did not wish the Society to incur the expense.

The announcement of the premiums awarded closed the twenty-third annual fair. The exhibition passed off without accident, or anything to mar the pleasure of the occasion. To the managers it was highly satisfactory and encouraging, in a pecuniary point of view, showing increased and increasing receipts, and giving promise of means of discharging liabilities, and enlarging the premiums.

The receipts in 1864 were	$1,485 00
In 1865	2,200 00
In 1866, with only one clear day during the fair	1,600 00
And this year	2,750 00

Officers for 1868: President, Warren Leland, Harrison; Recording Secretary, John Cowan, White Plains; Treasurer, N. Holmes Odell, Tarrytown.

JAMES GIBSON, *President.*

WYOMING.

The annual meeting of the County Agricultural Society was attended by about one hundred members, and the canvass for the officers was quite spirited. The following were elected: President, J. S. Walker, of Covington; Secretary, H. A. Dudley, of Warsaw; Treasurer, L. W. Smith, of Warsaw.

The following statement of the funds of the Society was made:

RECEIPTS.

From annual members	$180 00
From single tickets	561 26
Bounty from State	140 00
From other sources	254 70
	$1,135 96

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DISBURSEMENTS.

Paid premiums on articles	$271 62
On trotting	177 00
For general purposes	687 34
	$1,135 96
Due S. Fisher, balance of interest to June 8, 186.7	$19 14
Due H. A. Dudley, overpaid premiums	15 22

YATES.

PENN YAN, ——, 1867.

B. P. JOHNSON, *Secretary New York State Agricultural Society:*

SIR—The annual fair for 1867 was held at the Society's grounds, in Penn Yan, October 9th, 10th and 11th. The receipts, in round numbers, were $1,800.

There were a large number of entries made, and the masses in attendance showed an increasing interest in matters pertaining to agriculture.

The show of horses was excellent, and well calculated to keep up the reputation already attained by this county for fast horses, and horses for speed and work combined.

The cattle, particularly the Durhams, were out in large numbers, and elicited merited praise by lovers of neat stock. Breeders in this class are sparing no pains to produce the best animals; indeed, Yates county is becoming noted for its fine Durhams.

Of sheep, the Merinos decidedly took the lead in numbers and quality, being well represented. But few, comparatively, of the mutton varieties were shown. The class of "American Merinos" were largely represented, and by animals of decided merit. Harlow and Brother, of Alden, Erie county, N. Y., showed their celebrated stock ram, "Young Grimes," and his stock was represented by very choice lambs. There was also a good show in the class of "Fine Merinos."

There was a good display of farm implements and domestic manufactures; while the display in class "Floral and Artistic" was highly pleasing to all the lovers of the beautiful.

The fruit department was well calculated to please the eye, and more particularly the taste. The display of grapes was probably the most noticeable feature. This county is highly favored in its

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location and soil for the profitable production of the vine, particularly the shores of Crooked and Seneca lakes, with the southern slope of the stream connecting said lakes.

The Hon. E. B. Pottle, of Naples, Ontario county, N. Y., delivered on the last day of the fair a practicable and instructive address, which was listened to with marked attention by an appreciative audience, which soon after dispersed for their respective homes, each, no doubt, prepared to battle more successfully with the stern realities of life.

The following will show the financial condition of the Society:

RECEIPTS.

Balance in the hands of the treasurer from last year		$310 82
From memberships and admission to fair		1,355 00
State appropriation		76 25
Total		$1,742 07

EXPENDITURES.

For repairs to fair grounds	$471 39	
Expenses of conducting fair	387 20	
Premiums paid	619 00	
		1,477 59
Balance		$264 48

J. D. JACOBUS, *Secretary.*

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REPORTS

OF

TOWN AND UNION AGRICULTURAL SOCIETIES AND FARMERS' CLUBS.

AMERICAN INSTITUTE.

The board of trustees has the pleasure of reporting that the operations of the American Institute during the past year have been so important and successful as to warrant the hope that they will mark a new epoch in its history. The financial condition will be readily understood by a simple statement of the amount received from its principle sources of income, viz:

1. From members for admission fees and annual dues	$4,913 00
2. Rent of real estate (two quarters at $8,000, and two quarters at $20,000 per annum).....	14,000 00
3. Net proceeds of the thirty-seventh exhibition.....	15,000 00
4. Annual appropriation by the State for the encouragement of county agricultural fairs.....	1,187 50
Total.....	$35,100 50

From this must be deducted the annual taxes on the Broadway property, and the cost of improvements lately made on the same. The full payment of the incumbrance which has been on this property since its purchase in 1849, amounting to $18,297.67, and the current expenses of the Institute, which left on the 31st day of January, 1868, a balance in the treasury of $5,540.08. The details of receipts and expenditures will be found in the reports of the committee on finance.

In accordance with a stipulation in the lease of the property of the Institute on Broadway and Leonard street, the building has been thoroughly repaired and the cellar deepened, so as to make the basement available as a salesroom. About one-fourth of the cost of these improvements was paid by the occupant. The premises have again been let for the term of one year, from the

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1st of May next, for $20,000, payable in quarterly instalments. Although authorized by the Institute to sell the property for the sum of $200,000, the board has received no offer of that amount. The net income from the property, after deducting the amount paid for taxes and repairs, greatly exceeds the legal interest of the sum mentioned; and as real estate in the neighborhood is constantly increasing in value, not disposing of it at that price may be considered as fortunate for the interests of the Institute. Should it become necessary in providing the Institute with suitable permanent buildings for the holding of exhibitions, to spend at the outset a large sum of money, the property on Broadway might be sold for a satisfactory price, or should it be deemed best not to sell, there will be no difficulty in obtaining on it by bond and mortgage at least $100,000. Several of the trustees have been engaged in examining various localities, with the view of providing a permanent place for the holding of annual exhibitions, and at an early day the board will make a special report on the subject.

The remarkable success attending the last exhibition deserves especial notice. The board of managers embraced members of great experience in the business of conducting fairs, as well as those who for the first time acted in that capacity, and who doubtless had some new views in relation to the best course to be pursued. They seemed to have been entirely harmonious in their deliberations, and their combined wisdom in giving efficiency to the new by-laws of the Institute, relating to exhibitions, has resulted in a return of profits more than twice as large as that from the most successful of all previous fairs, that of 1849. To fully appreciate the importance of this result, it is only necessary to state that by the exhibitions of the years 1853, '59, '60, '63, the Institute lost $13,128.94; that the total surplus from all of the exhibitions from the year 1851 to 1867 was $25,370. 26, the losses within the same period being deducted from this sum, the actual gain is found to be $12,241.32; while if we add the State appropriation, which has latterly been included, making up the final balance sheet of profits, the actual surplus derived from the exhibition of 1867 is shown to be $16,187.50, an amount nearly four thousand greater than that derived from all the fairs held by the Institute for the past sixteen years. Not less gratifying is the present aspect of other departments of the American Institute. The Farmers' Club has met regularly during the past year, and disseminated through various journals which report its weekly proceedings, a vast amount of

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useful knowledge, relating to practical agriculture. The Polytechnic Association has never failed to assemble at the appointed hour, to examine new inventions and discoveries, and to contribute its share towards the advancement of the sciences, and their applications to the arts.

During the past year, the American Photographical Society decided to relinquish its distinct existence and become a part of this Institute, under the title of the Photographical Section. Its organization has, by a vote of the Institute, been placed in charge of the committee on chemistry and mineralogy. A reference to the report of the library committee will show that valuable additions of books have been lately made, and that the interest in the reading department of the Institute is steadily increasing. The great accession of new members is perhaps the most gratifying fact in the history of the past year. It indicates that the Institute is rapidly becoming more attractive, and offering new inducements to men of all ranks of society for enlisting in the cause which has for its ultimate object the diffusion of useful knowledge, and the increase of the material resources of every part of the whole country.

All of which is respectfully submitted.

NEW YORK, *February* 6, 1868.

FINANCES.

Receipts and Disbursements of the American Institute of the city of New York for the year ending January 31, 1868.

Balance in the treasury, January 31, 1867		$1,346 11
RECEIPTS.		
Rental of property	$14,000 00	
Admission fees, dues and life members	4,913 00	
Managers of the thirty-seventh annual fair	15,000 00	
State appropriation, 1866	1,187 50	
Miscellaneous sources	227 22	
		35,327 72
		$36,673 83
DISBURSEMENTS.		
Repairs and commission renting property	$2,325 90	
Taxes and insurance	2,705 51	
Balance due on bond and mortgage	17,000 00	
Interest on bond and mortgage	1,301 45	
Trial of hay-forks and strawberry exhibition	105 71	
Books, periodicals and binding	378 73	
Printing and stationery	233 54	
Rent at Cooper Union and gas light	2,004 96	
Reporting Polytechnic Association	40 00	
Freight and expenses, Transactions from Albany	62 75	
Restriking medals	12 75	

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Salaries	$4,364 00	
Newspapers, advertising, postages and incidental expenses	598 45	
		$31,133 75
Balance in bank, January 31, 1868		$5,540 08

THOMAS M. ADRIANCE,
THOMAS WILLIAMS, Jr.,
CYRUS H. LOUTREL,
NATHAN C. ELY,
CHAS. CHAMBERLAIN,
Finance Committee.

REPORT OF THE COMMITTEE ON AGRICULTURE.

The committee on agriculture of the American Institute beg leave to report, that they have great pleasure in informing the Institute, that the Farmers' Club, which is placed under their immediate direction, is increasing in interest. There are now in attendance at its meetings representatives from six of the principal papers published in our city, so that the reports of the discussions and communications reach every part of our country.

One important feature of the Club during the past year was the trial of several farm implements, among which was the trial of horse hay forks in Westchester county, which occupied two days, and was of great interest, showing by actual experiment, the working of some twenty different modifications of this implement, which has come into use within the past few years, and one that is deemed of such vast importance to the farmer, when we take into account that the hay crop in the United States, according to the last census, amounted to over nineteen millions of tons.

The committee feel confident in asserting that the greatest results are realized from deep tillage, and by this means larger crops are produced with much less expense, and we think that a person who cultivates ten acres twenty inches deep will grow rich in eight cases out of ten, while he who cultivates twenty acres ten inches deep, or less, will not often succeed in farming pursuits. Farmers in general will be found to have under culture twice as many acres as their capital or ability, if consulted, would dictate.

Among our American farmers, manures and the best modes of application, are not well understood; and we are too apt, as a class, to give a great many acres a scanty supply, rather than giving a full supply to a few acres.

By a rule adopted last December, it was decided to have a paper

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read at each meeting of the Club, and the following gentlemen were appointed to prepare them:

"Farm Buildings, Mr. S. Edwards Todd; "Germination of the Potato," Dr. F. M. Hexamer; "Pasture lands of the South," Mr. Joseph B. Lyman; "Clover as a Fertilizer," Dr. J. E. Snodgrass; "Raspberry," Mr. Thomas Cavenach; "Mowing and Reaping Machines," Mr. James M. Allen; "Manures," Mr. P. T. Quinn; "Importance of Planting Forest Trees," Mr. N. S. Fuller; "Necessity of a General Railroad Law for the benefit of Agriculture," Dr. Isaac P. Trimble.

The list will be extended from time to time as subjects suggest themselves.

During the past year the correspondence of the Club has been very extensive; the Secretary, Mr. Chambers, has received over 12,000 communications, asking for information connected with agricultural pursuits, for seeds, &c., and giving the experience of the writers on their mode of cultivation, &c. The most important of these letters are condensed in the reports, and will be found in the Transactions of the Institute. These letters were received from twenty-eight different States, showing how extensively the reports of the Club have been circulated. The committee take great pleasure in stating that Mr. Nathan C. Ely, the permanent chairman, has presided with marked ability at most of the meetings, which have been held every Tuesday during the year. During his temporary absence Prof. Tillman has officiated in his stead.

Your committee cannot close this report without alluding to the death, in July last, of their associate and chairman of the committee on agriculture, Mr. John G. Bergen, who had for many years been a faithful attendant at the meetings of the Club, and whose experience on agriculture was always listened to with respect and great benefit.

All of which is respectfully submitted.

NEW YORK, *February* 4, 1868.

REPORT OF THE COMMITTEE ON HORTICULTURE.

Your committee have watched with much interest the progress of this branch of domestic industry, which contributes so largely to our luxuries, as well as our necessities. They have been gratified to perceive no interruption to improvement in the excellence and beauty of both fruits and flowers; but they cannot help adding

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that too many varieties of both get before the public, not only without sufficient merit of their own, but without such an endorsement from competent bodies, as is calculated to win and justify public confidence. There can be no doubt not only that very large sums of money are yearly wasted in this way, but that the progress of horticulture is needlessly impeded. The evil has got to be of such magnitude that the feeling has become quite general that a remedy of some kind is imperative. The question arises whether it is not within the scope of the American Institute to do something to correct this evil. Your committee are of opinion that it is, and that the subject should be referred to a competent committee for consideration. We have too many novelties and too few means for ascertaining their real merit.

The great strawberry show held in our rooms last June may be taken as evidence that the interest felt in the improvement of this delicious fruit remains unabated. Large numbers of new kinds, noted for their size and productiveness, were brought together from various parts of the country, and these, together with many samples of the good old varieties, made a very interesting exhibition. The season, however, in the vicinity of New York, was so wet and unfavorable as not to warrant any safe deductions as to the actual merits of most of the new kinds; and the same remark will hold equally true of apples, pears, peaches, grapes, &c., which were mostly flat and insipid in flavor. It is interesting, however, to note in this connection the compensating advantages of a variety of climate, such as we enjoy; though a crop may be very poor and worthless in one section, or even entirely fail, it is quite sure to be abundant and excellent in some other, and we shall thus always, probably with our rapid modes of intercommunication, be secure from the evils of famine. It may be remarked here, in a general way, that notwithstanding the supply of fruit is nearly doubled each year, it is not yet equal to the demand; and this will, without doubt, continue to be the case till the taste for choice fruit has become prevalent among all classes of people, or rather, perhaps, till fruit has become so abundant and cheap that all classes can afford to use it freely.

Your committee are of opinion that the Institute should give proper encouragement to monthly exhibitions of fruit and flowers, by which means the best kinds, in their seasons, would be presented to the public for examination, and their taste and knowledge thus

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improved, while at the same time the grower would be benefited to an equal extent, in a pecuniary point of view The benefit to the Institute would be quite as great as to either of the other parties, since it would keep it more constantly before the public, and thus popularize it, and that would seem to be an end very much to be wished.

It may be remarked here that grape culture has already got to be one of the largest and most remunerative departments of fruit culture, and it is gratifying to know that nearly every section of our vast country is more or less adapted to the successful culture of this important fruit. What is chiefly wanted now is correct knowledge of the habits of the vine, and of the best modes of culture and training, without which success becomes a mere matter of chance.

The interest in fruit culture has been much increased by the discovery of Mr. Nyce, by means of which he has been enabled to erect houses in which fruit may be kept in sound condition for several months after being gathered; some kinds, indeed, such as the apple and pear, for a year or more. One of these houses has been erected in New York, and from it our market is now being supplied with sound grapes, as well as apples and pears out of their season, of which the Bartlett may be mentioned as an axample of the last. This supply can be continued during the year. The fruit retains a great degree of its original freshness and flavor. The importance and value of such fruit preservatories will be readily appreciated. While it is not to be expected that all the members of the Institute should feel the same degree of interest in horticulture that your committee do, they still cannot help urging the importance of extending to this branch of domestic industry a full share of encouragement, being convinced that such a course would benefit the Institute quite as much as the public.

Horticulture, hitherto, has not been encouraged, or at least appreciated, in New York to the same degree that it has been in other large cities. Your committee simply state the fact without attempting to account for it. It is to be hoped that in the new building which the Institute proposes soon to erect, ample provision will be made for the growth and exhibition of rare and beautiful plants; a place where the products of the gardener's skill may be exhibited without certain ruin during the first twenty-four hours. A place is wanted where plants, &c., may not only be shown without damage, but where the public may examine them conveniently and

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well. Such a place it would not be difficult to provide in any new building the Institute may erect.

All of which is respectfully submitted.

WM. S. CARPENTER,
ISAAC BUCHANAN,
B. C TOWNSEND,
Committee.

NEW YORK, *February* 5, 1868.

REPORT OF THE BOARD OF MANAGERS.

The board of managers of the thirty-seventh annual exhibition of the American Institute respectfully submit the following:

The board was duly organized on the 25th day of February, 1867, by the election of William H. Butler as chairman, Thomas McElrath as vice-chairman, and John W. Chambers as secretary.

Early in June the managers announced that an exhibition of strawberries and hot-house grapes would be held at the rooms of the Institute. A number of special premiums were offered by several of the trustees and managers, which had the effect of bringing together a large number of competitors. The exhibition opened on the 25th of June, and continued for two days. It is believed that in respect to size, quality and number of varieties, this show of strawberries has never been surpassed in this country.

A full account of berries and plants exhibited, and the awards made, will be found in the appendix to this report.

In accordance with the opinion very generally expressed in favor of holding an autumnal exhibition, the board early took the initiatory steps in relation to procuring a suitable building for that purpose.

After it had been decided that an exhibition building could not be erected by the Institute and completed in time for occupation in the fall, the board directed its attention to securing suitable premises for a short term. A careful survey of various localities by a committee appointed for that purpose, resulted in a report that no more commodious building could be found than the armory of the twenty-second regiment N. G. S. N. Y., on Fourteenth street, when enlarged by certain permanent and temporary structures. Accordingly, on the 26th day of June, 1867, an agreement was made with that regiment whereby, in consideration of the use of the armory during a portion of the months of September and October, the board bound itself to lay a new and superior floor over the whole of the great hall, to construct, on the north and south sides, large

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galleries, and make other improvements specified, the whole of which were estimated to cost about six thousand dollars.

In addition to this work, which was done by Messrs. Hunt & Son, the board were obliged to erect, on Fifteenth street, a temporary structure extending along the whole width of the armory, and covering a portion of the sidewalk, for the accommodation of the boilers which were to furnish steam for driving the numerous machines to be set in motion, a certain portion being reserved as a restaurant.

In the meantime circulars were issued by the board announcing that the grand autumnal exhibition of the American Institute would open on the 12th day of September, and close on the 26th day of October. The rules and regulations adopted by the board and the classification of the articles to be exhibited, adopted by the Institute, were also published.

Although inventors, manufacturers and producers generally, had but little more than two months for preparation, the letters received by the corresponding secretary, and containing applications for space, were soon so numerous the board were convinced that the premises provided would be too small to accommodate all who were desirous of becoming exhibitors. It, therefore, early became necessary to refuse admission to certain classes of manufactures, such as carriages, &c., each of which required considerable room, and to restrict the exhibitors of working machines to the use of only such space as was absolutely required. Within a short time after the day designated for the reception of goods, every part of the building was filled; it seemed as though all available space was occupied, yet the subsequent reception of articles from a distance which had been delayed on railways, and for other unavoidable causes, rendered further contractions of allotted space necessary, which was generally submitted to by exhibitors, who, by this and other acts, evinced their willingness to ensure the general success of the exhibition.

A reference to the by-laws adopted by the board will show how, by a proper division of labor, the arduous duties of the management were performed. It is only to be regretted that the continued absence of several of the managers threw an unexpected burden on the remaining members of the board.

The whole available space, after laying out the passages and avenues to be used by visitors, was appropriated proportionally to seven departments, each of which was subdivided into seven groups.

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Each department was placed under the absolute control of a committee of three members, it being understood that the chairman of each committee was mainly responsible for its action. By the adoption of this course it was found in practice that a vast amount of work was performed without any serious clashing of authority.

The experiment of arranging the exhibition according to the complete classification of articles adopted by the Institute, was made for the first time by the present board; and although at the outset some doubts were entertained as to its working well in all respects, the actual experiment has demonstrated that it is of great service, not only to visitors seeking the locality of any article, and to exhibitors who find themselves side by side with their competitors, but chiefly to the board of managers, who find that systematic arrangement is conducive to order, and enables them to detect at a glance any infringement which tends to disturb the general harmony.

In addition to the departmental committees, seven more were organized, on which devolved the general business of the exhibition. These were, 1st, on finance; 2d, on tickets; 3d, on printing and invitations; 4th, on carpenter work; 5th, on police, light, music and decorations; 6th, on stands and refreshments; 7th, on the reception of goods.

It might be deemed invidious to mention those who have been most prominent in the discharge of their official duties, since the whole history of the management will show that each active member has devoted to it all the time and service which his individual business did not imperatively require.

The exhibition was opened on the day first appointed by an address from the President of the Institute, the Hon. Horace Greeley, who commanded the undivided attention of a vast audience for an hour in an able exposition of the claims of labor and creative art, concluding with a clear statement of the aim and objects of the American Institute, and the importance of early securing for it a structure commensurate with its wants.

The display opened under the best auspices, and having been early pronounced by the press and public to be superior in extent, variety and attractiveness to any former exhibition, its success was ensured from the first. A constant succession of clear, sunny days, continuing, with a few exceptions, to the close, doubtless aided in securing a large attendance, which was generally increased in the

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evening to such an extent as to deprive many of an opportunity of examining with care the most interesting inventions.

Every department teemed with novelties, and nearly every group contained specimens of the articles which had been assigned to it in the classification.

The department of engines and machinery occupied the largest share of space, and was mostly filled with new inventions.

In the department of fine arts and education, among the most noticeable features, were the photographic displays, pianos and optical instruments.

The department of the dwelling contained almost every conceivable device for lessening the severity of domestic labor—table utensils, furniture, and many ornaments for the house. Among the many novelties in the department of dress and handicraft, were the latest inventions for sewing and knitting.

The department of chemistry and mineralogy contained many new specimens and preparations.

The small space allotted to the department of intercommunication was overcrowded with novelties relating to railways, common roads, navigation, trade, telegraphs, printing and public structures; that which attracted most attention being the full sized pneumatic railway, extending across the building, and built expressly by the projector for this exhibition, at a cost of nearly six thousand dollars.

The display of plants, vegetables, fruits and flowers, in the department of agriculture and horticulture, was very creditable, while the number of new and useful farming implements was quite large, considering no opportunity could be given for testing their merits.

In addition to fine instrumental concerts given each evening, a musical treat was provided during a portion of each day by the performance of a mechanical or automatic organ, called the "Orchestrion."

With regard to the award of premiums, it may be said that unusual care was taken in the selection of judges, among whom were found some of the leading scientific men of this and neighboring cities.

The duty of testing machines and instruments, analyizing chemical compounds, examining in detail works of art and useful implements, was performed generally with unusual scrutiny and impartiality; and although in some few cases their judgments have, as might

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have been expected, given offence, and for which the board of managers have been blamed without cause, since the laws of the Institute forbid their interference in relation to the comparative merits of competing articles, yet they cannot let this occasion pass without placing on record its opinon that the thanks of the Institute are eminently due to the judges of the thirty-seventh exhibition. After a season of unexampled success, the pleasures of which were marred only by accidents to persons having charge of the machinery, one of which resulted fatally, the exhibition was terminated on the evening of the 26th of October by the award of premiums, viz:

DEPARTMENTS.	PREMIUMS.		
	First.	Second.	Third.
1. Of Fine Arts and Education	18	20	31
2. Of the Dwelling	7	32	46
3. Of Dress and Handicraft	20	19	31
4. Of Chemistry and Mineralogy	20	17	8
5. Of Engines and Machinery	22	74	62
6. Of Intercommunication	29	6	3
7. Of Agriculture and Horticulture	11	20	10
Total	127	188	191

The closing address was made by the Rev. Henry Ward Beecher, and was listened to by as many as could press within the sound of his voice. His stirring appeal in favor of fostering the inventive genius and mechanical skill of America, as applied in the workshop and the field, made a deep impression, and will be long remembered by those who heard it as giving new assurance that the eloquence of the highest order will be always arranged on the side of material progress.

ALLEN SETTLEMENT.

MAINE, BROOME CO., N. Y., *January* 31, 1868.

Officers for 1868; President, E. J. Councilman, Maine; Secretary, Spencer S. Allen, Maine.

The Club was organized January 4, 1862, and now numbers twenty members, and possesses a library of seventy-five volumes. We held no agricultural fair last year.

S. S. ALLEN, *Secretary.*

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AMBER.

AMBER, *January* 11, 1868.

B. P. JOHNSON:

SIR—The Otisco Farmers' Club report, that at the date of the last report there was $96.79 on hand, and there has been received by the Club the sum of $119.34; there has been paid out $168.66, leaving a balance on hand of $26.07, at the date of treasurer's report. January 6, 1868.

As formerly, regular meetings for lectures, essays and discussions, have been held weekly during the winter season, in which members, and others present at its meetings, participated. Theories, experiences of farming industry, are discussed and compared, and much practical knowledge and suggestions are thus imparted and exchanged.

The statistics have been taken in the several school districts of the towns (four in number) set to this club in the apportionment of the county, and a copy of the same sent to the Secretary of the State Agricultural Society at Albany.

The sixth annual fair was held on the fair grounds in Amber village, on the 2d day of October, 1867, and was everything to encourage and stimulate the friends of our enterprise. The weather was somewhat stormy, but the fair was a decided success.

The display of horses was good, embracing many noble animals exhibiting traits of endurance and possessing great speed and almost faultless form.

The show of cattle was not as large as on some former occasions, although there were some very fine animals, especially of the Devon class, on the ground.

In the department of sheep the show of coarse wools was not large, but of superior quality; that of fine wools was well represented. Some very fine Spanish and Silician merinos were on exhibition, showing, in a measure, the improvement that has been made in the last century in that class of domestic animals.

The show of swine was small, yet the samples were good, showing some of the improved breeds existing at the present day.

The domestic and ornamental department was well represented, which must be credited to the ladies, they having here, as on former occasions, done their part well, and added much to the interest of the show.

The display of fruit was somewhat limited, yet there were some

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good samples, more especially that of grapes, which are being cultivated near the eastern shore of the lake.

The samples of cereals and vegetables were of a good quality, and more extensive than on former occasions.

The exhibition of dairy products and domestic cookery was all that could be expected in this locality.

The department of implements and machinery was good and more numerous than on some former occasions.

Connected with the fair ground is a good half-mile track, which was occupied a portion of the time by some fast trotters.

At the annual meeting of the Club, held at the agricultural hall in Amber, January 6, 1868, the following named persons were duly elected officers for the current year: President, Charles E. Niles; Recording Secretary, James L. Niles; Corresponding Secretary, George D. Bishop; Treasurer, James H. Redway.

All of which is respectfully submitted.

JAMES H. REDWAY *Treasurer.*

BARTON.

Report of the transactions of the Barton Agricultural Society for the year 1867:

Balance from 1866	$219 60
Receipts, 1867	604 37
	$823 97
Disbursements	568 00
Balance to account, 1868	255 97
	$823 97

Officers elected for 1868: President, William E. Moore; Treasurer, Squire Whitaker; Secretary, James S. Murray.

LEVI S. WESTBROOK, *President.*

SQUIRE WHITAKER, *Treasurer.*

BROOKFIELD.

BROOKFIELD, *January* 30, 1868.

Hon. B. P. JOHNSON:

DEAR SIR—I herewith take pleasure in transmitting to you a report of the Brookfield Agricultural Society for the year 1867.

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Our eighteenth annual fair was held on the Society's grounds, in Clarksville, on the 1st and 2d days of October, with a great degree of success to the Society and the friends of agriculture. The weather was very fine both days of the fair, and the attendance was fully equal to any of the preceding fairs.

The entries in some of the classes was quite large, but the exhibition in the tent was not as good as it has been some years. The show of horses, cattle, sheep, &c., was very fine, the number of entries in these classes being quite large, showing the increasing interest which our people take in the improvements of the day, towards stimulating and forwarding these improvements in our town, this Society feels that it has contributed to a great extent.

The annual address was delivered by the Hon. Wm. L. Chaplin, of Cortland county, N. Y., and was listened to by a large number with much pleasure and profit, we have no doubt, from the close attention that was given to it.

The annual meeting was held on Tuesday, the 14th day of January, 1868, at which the following officers were elected for the ensuing year: Thomas R. Gorton, President; William N. Stillman, Secretary; A. W. Mowrey, Treasurer.

The folllowing is the treasurer's report:

Dr.

To balance from last year	$62 50	
To receipts for present year	640 96	
		$703 46

Cr

By paid last year's premiums	$60 20	
By paid committee on improvement of grounds	209 36	
By paid expenses of fair	295 50	
By paid cash premiums	204 15	
By paid for agricultural papers	36 50	
		$805 71
		703 96
Amount due treasurer		$101 25

There was awarded 19 volumes of Transactions as premiums.

All of which is respectfully submitted.

WILLIAM N. STILLMAN, *Secretary.*

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CAMDEN.

CAMDEN, *February* 21, 1868.

Hon. B. P. JOHNSON, Esq.:

DEAR SIR—I herewith transmit to you the report, as was directed: Whole number entries for 1867, 439; members, at 50 cents, $771; single tickets, at 15 cents, $704.

Our premium report calls for 12 volumes Transactions.

Yours respectfully,

C. J. WRIGHT, *Secretary.*

CASTLE CREEK.

CASTLE CREEK, *January* 2, 1866.

DEAR SIR—The Farmers' Club of Castle Creek reorganized on Friday evening, and the following were elected officers: Isaac Emens, President; S. F. Black, Recording Secretary; P. B. Spencer, Corresponding Secretary; James Gaylord, Treasurer. We have been organized three years.

Our expenses during the past year have been about ten dollars; receipts during the same, about twenty dollars.

We have a library of about thirty selected books. Meet each week during the winter months.

Yours respectfully,

ISAAC EMENS.

CAZENOVIA.

CAZENOVIA, *January* 24, 1868.

Secretary New York State Agricultural Society:

DEAR SIR—At the semi-annual meeting of the Cazenovia Farmers' and Mechanics' Association, held Saturday evening, January 11, 1868, the following officers were chosen for the ensuing year: President, George S. Ledyard; Secretary, Irving C. Forte; Treasurer, Bowman H. Stanley.

Yours truly,

IRVING C. FORTE, *Secretary.*

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CONSTANTIA.

To the Secretary of the New York State Agricultural Society:

The annual fair of the Constantia Town Agricultural Society for the year 1867 was held on Friday and Saturday, October 4 and 5, on the grounds immediately adjacent to the shore of Oneida lake, well suited for the purpose, and admirably arranged by the executive committee, the whole being inclosed by a board fence, with the Oneida lake laying open on the south. The stock was well shaded and provided for.

The growing interest on the subject of stock raising, crop growing and manufacturing in our section is truly great, compared with former seasons.

As to the number and character of the stock, it manifested a corresponding improvement.

There is a lively interest felt by our farmers in the growth of wool; the Merino breed of sheep having the decided preference, caused by the importation of a number of the choicest Merinos by Mr. Elijah Hallenbeck, of this place, who has devoted much time to the growth and quality of wool.

The plowing match was of the closest character, and the judges found it difficult to decide.

The small charge for admission was found to work well, the receipts amounting to $208, which was awarded in premiums. The Society is not in debt, but holds a small surplus for contingent expenses.

According to the provisions of the constitution, the annual meeting was held on the 5th day of October, 1867, when the following officers were elected for the ensuing year: Jas. Dickie, President; Frederick C. Lander, Secretary; Jerome Taylor, Treasurer. It was decided to hold the fair of 1868 on the same grounds.

FREDERICK C. LANDER, *Secretary.*

DELHI.

DELHI, *January* 15, 1868.

B. P. JOHNSON, Esq., *Secretary New York State Agricultural Society:*

The following report of the operations of the Delhi Agricultural and Mechanics' Society, for the year 1867, is made by the undersigned, officers of said Society:

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The sixth annual fair and cattle show of the Society was held on its grounds on the 26th and 27th days of September. The forenoon of the first day was devoted to making entries, arranging stock and articles for exhibition, and preparing the lists for the judges, the latter performing their duties during the afternoon; the horses and working cattle being moved and exhibited on the track and grounds.

During the forenoon of the second day the time was mostly occupied in the exhibition of premium stock and display of articles, while the officers prepared the lists of premiums awarded.

In the afternoon, Luther H. Tucker, Esq., of Albany, delivered before the Society a very excellent address, containing many practical hints and suggestions, which, if acted upon, will prove of much benefit to those who had the pleasure of listening to it. At the conclusion of the address the awards were read off, and the exhibition closed.

There seems to have been more attention paid to the breeding of fine horses in this section for a few years past than formerly. It is believed that few counties can boast a stock of more substantial and serviceable horses for general use than this, while some are by no means slow roadsters.

There has been a steady improvement in the breeds of cattle. There were some of the largest and finest working cattle on exhibition that has ever been seen in this (Delaware) county. There was also a fine show of young stock, giving promise of future excellence. But as stated in former reports, this section of the State is mainly devoted to the butter branch of the dairy, and therefore the improvement in the breeds furnishing the largest quantity of rich milk is the object most sought, and to which attention is mostly directed.

Of sheep, the exhibit was the best in point of numbers and quality ever present at any of the fairs of this Society.

The exhibit of swine consisted mainly of animals kept for breeding, although there were some litters of pigs of improved breeds, each one of which looked as if it was a nucleus around which a barrel or two of pork could easily be formed with proper feed.

The show of poultry was fair, as was also that of agricultural and mechanical implements.

As is generally the case, the ladies' department was the source of greatest attraction, the large hall being constantly thronged with

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visitors; the articles on exhibition showing much taste, ingenuity and skill in their production.

The dairies were also represented. No better butter can be made than is found in this vicinity. There was also some cheese, of excellent quality. A very small portion of the latter article is made in this town or county.

In vegetables, there was the usual large variety, quantity and quality.

The weather was very favorable both days, the attendance of exhibitors and spectators consequently larger than on most of the previous fairs of the Society.

Financially, the Society is about the same as at last report. The expenses of repairing grounds, fences, &c., with those attending the holding of the fair, and the interest on the debt created in the erection of buildings last year, has absorbed our income.

Meetings for the discussion of agricultural subjects have been revived this winter. They have proved beneficial as well as interesting.

The subject of fruit should have been mentioned above, but was inadvertently omitted. The variety of fruits has considerably increased at our fairs since its organization. The fruit crop has been extremely light in this portion of the State for the past two or three years. Many varieties of apples, some sorts which seem to be best adapted to our soil and climate, are of excellent flavor. Pears, plums, cherries and grapes do not flourish without extra care and cultivation. Most kinds of berries grow exceedingly well, and are productive.

I. H. GRAHAM, *President.*

NORWOOD BOWNE, *Secretary.*
ANTH. M. PAINE, *Treasurer.*

EAST MAINE.

EAST MAINE, *February* 1, 1868.

Hon. B. P. JOHNSON, *Secretary New York State Agricultural Society:*

DEAR SIR—The report of the Farmers' Club of East Maine, for 1867, is herewith submitted.

The Club is in working order, meeting every week to discuss given subjects pertaining to the cultivation of our farms; and on the first meeting of every month we generally have a speaker from

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abroad to deliver an address. Sometimes a practical farmer; sometimes the scholar, on some other subject. Anything received on these occasions, except party politics, or sectarian religion.

It is ten years last November since the Club commenced, and although the place of meeting is the most bleak and drifty of any place I know of between lake Erie and the Mohawk, they have, in all that time, failed only twice on account of weather, to have a meeting at the time appointed.

The officers for the ensuing year are, President Abm. H. Green; Secretary and Treasurer, Robert Hogg. P. O. address, East Maine, Broome Co.

The library contains about eighty volumes. The only additions last year were the Reports of the New York State Agricultural Society, the American Institute, and the Agricultural Department at Washington.

The list of members numbers twenty-six. Every person becoming a member pays the sum of ten cents, which about supplies the Club with light and stationery.

The discussions seem to be more interesting this season than ever before, and there is no doubt but the marked and rapid improvement of this locality is owing to the labor of the Club.

With this brief report of the doings of the Club, we remain in hope of a continuance of your valuable favors in Reports, or anything else that may fall to our share.

Most respectfully, yours &c.,

ROBERT HOGG, *Secretary.*

ELLISBURGH, ADAMS AND HENDERSON.

ADAMS, *December* 20, 1867.

To B. P. JOHNSON, Esq., *Secretary New York State Agricultural Society:*

The annual report of the Ellisburgh, Adams & Henderson Agricultural Society is submitted. This Society held its annual fair at Adams, Jefferson county, N. Y., Sept. 17th and 18th, 1867. The number of entries was four hundred and ninety-one.

The annual meeting was held at Belleville, December 19, 1867, when the following report, made by the treasurer, was accepted, from December 15, 1866, to December 19, 1867:

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Amount on hand as per last report		$635 92
Received from members at annual meeting		13 00
Members' tickets (two days' fair)		468 00
Gate tickets (two days' fair)		282 42
Entrance on speed		22 00
Rent of fair grounds		50 00
Donation		42 00
Interest from cash on hand		31 50
From all other sources		7 00
		$1,561 84
Amount paid for premiums	$540 50	
Services and repairs	208 68	
Printing	46 00	
Postage	10 00	
Rent of ground	50 00	
Former indebtedness	124 10	
		979 28
Balance on hand December 19, 1867		$572 56

A. DICKINSON, *Treasurer.*

The officers elected for the ensuing year are: James F. Converse, of Ellisburgh, President; Alexander Dickinson, of Ellisburgh, Treasurer; T. V. Maxon, of Adams, Secretary.

S. D. HUNGERFORD, *President.*

T. V. MAXON, *Secretary.*

GALEN.

At the annual meeting of the Galen Town Agricultural Society, held at their room in town hall, February 1st, 1868, the following officers were elected for the ensuing year: Daniel Jenison, President; Joseph Watson, Secretary; Seth Smith, Treasurer.

Resolved, To hold a fair next autumn, on a day to be fixed by the board hereafter.

Treasurer reported funds on hand, $23.04; also some volumes of Transactions of State Agricultural Society and Institute.

Library in good condition, but not sufficiently read.

Adjourned to meet again at the call of secretary, in June or July next.

JOSEPH WATSON, *Secretary*

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GOUVERNEUR.

The Gouverneur Agricultural and Mechanical Society held its ninth annual fair on the Society's grounds, at Gouverneur, N. Y., on the 18th, 19th and 20th of September, 1867.

The exhibition was very creditable to the industry, enterprise and genius of our farmers, mechanics and artists. Considering the abundant resources within reach of the Society, not so many articles were exhibited as could have been desired; still the number of entries exceed those of the preceding year.

The board of managers increased the number of premiums, and in some instances the amount. There is no doubt a greater liberality in this matter would add to the prosperity of the Society.

All the debts of the Society incurred during the year 1866, for the erection of buildings and fencing have been paid, leaving a balance in the hands of the treasurer, as will appear by his report.

In blood and grade cattle, some animals of unusual excellence were on exhibition, showing that our farmers fully appreciate the advantage derived from careful breeding of the best varieties. The Ayrshires seem to be the greatest favorites, though the Durhams have their admirers. The show of native cattle was very fine, yet, considering this so largely a grazing district, a greater number of entries in this class would have represented the cattle interest more fully and been more creditable to the fair.

The display of horses was equal to that of other years, indicating that the interest taken by breeders in that noble animal undergoes no abatement.

The show of sheep was creditable to the wool-growers, but not so large as it should have been.

The exhibition of swine and poultry was meagre, though there were some fine specimens in each class that would compare favorably with any found at other fairs in the State.

In the mechanical department not so great a display was made as could have been desired. This is owing more to the want of a suitable place for the mechanic to exhibit his manufactures in than to a want of interest. A suitable building, whereby the exhibitors could have a safe place, secure from the weather, would be sufficient encouragement to make this department a success.

Floral hall, which has heretofore been the centre of attraction, and a very interesting feature in the exhibitions of the Society,

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was never more beautifully trimmed and tastefully decorated. Too much praise cannot be given to the ladies for the interest taken by them in making the exhibition in Floral hall a success.

The annual address was delivered by Hon. Horatio Seymour, at one o'clock, P. M., on the last day of the fair. Though the wind was blowing almost a gale, and clouds of dust enveloped the speaker, yet the clear, logical reasoning of the lawyer and statesman, the practical, sound sense of the farmer and economist, instructed and charmed an attentive and an appreciative audience.

At the conclusion of the address, on motion of the president, it was

Resolved, That the thanks of the Society be tendered to Hon. Horatio Seymour for the able, interesting and instructive address delivered by him before the Society.

All premiums awarded by the Sociely have been paid, except $10; those to Gates Curtis, of $3, and Fred. H. Norton, of $1, were donated to the Society; the balance, $7, was not called for.

Officers for 1868: Peter Chamberlain, President; Wm. H. Walling, Secretary and Treasurer.

W. H. WALLING, *Secretary.*

HAMMOND.

NORTH HAMMOND, *November* 20, 1867.

Hon. B. P. JOHNSON, *Secretary of the New York State Agricultural Society:*

DEAR SIR—The following is a condensed statement of the transactions of the Hammond Union Agricultural and Mechanical Society, which I submit to you with pleasure:

Although ours is a side show, yet we have been crowned with success in our exhibition the present year. The fair was held on the 2d, 3d and 4th days of October, it being the seventh exhibition, and the first one which the elements have favored us with three fair days.

The price of admittance being fifteen cents, or ten checks for a dollar to memberships, our receipts run up to $372.74. Paid for premiums, $152.50; expenses, $129.49; leaving a balance of $90.75, which just canceled the old indebtedness of the Society, leaving it free from any claims whatever.

Our grounds are pleasantly situated, and enclosed by a high

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fence; with a very large hall for domestic and mechanical articles, &c., &c.

The show of stock was good, cows in particular. The show of fruit was very fine, and quite extensive. The vegetable department was somewhat deficient; while the ladies' department and floral hall was embellished with numerous specimens of their handiwork.

Owing to the extreme dry weather the plowing match was not quite so spirited as usual.

The citizens offered several large purses for the trials of speed, which brought out some very fine horses, as well as a large crowd of people, and all passed off quietly, giving good satisfaction generally.

The Society is in a flourishing condition, and its future prospects to-day are brighter than ever before. At a special meeting recently held, all obstacles which have heretofore embarrassed the Society were removed, and we hope to continue in the promotion of science.

The officers of the Society are as follows: President, David Gregor; Secretary, C. A. Wooster; Treasurer, Irenus Franklin.

Yours, very respectfully,

C. A. WOOSTER, *Secretary*.

HESS ROAD.

To Hon. B. P. JOHNSON, *Secretary New York State Agricultural Society, Albany:*

DEAR SIR—It is with pleasure I forward you to-day my fourth annual report of the doings of this Club, embracing, however, only a meagre summary of the proceedings of the past year.

Our meetings have been regularly held every week, except about two months during the press of labor, from the middle of July to the middle of September. They have been generally well attended; and never since our organization have they been better attended than at present.

When we first organized, with a half-dozen members, we hardly dared hope to succeed; but our experiment has proved a success, and I think no one of its members would now be willing to let it stop.

We have embraced a wide range of subjects pertinent to our

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calling, and they have been considered with interest. We find that very few men *know so little* but we can gather some useful hint from what they may say; many a fact which we may know so well that we suppose every body else knows the same, we find new to every one but ourselves; and this is one of the great beauties of our Club, it is in comparing notes and opinions with one another, and thus mutually benefiting each. Were we benefited in no other way, we would find ample remuneration for all the time and trouble in the friendly good feeling which the association creates among its members.

It is very seldom that we all agree in opinion on any subject, yet however much we may differ, it is all with kindness and without anger, and this difference of opinion is one of the very best features of our associating together, for thus we get out the facts.

I am happy to announce that our example is spreading; several of our members having been called upon to aid in the organization of clubs in other places. I am unable to see why farmers are not more awake to their interests all over the country. All other classes of the community and all trades have their associations for mutual benefit and protection; and why do not the "tillers of the soil?" Is their calling the less honorable, or the less worthy? Surely I think not; and that it is the less remunerative, I think is only the fault of themselves. The fact is, they work too much with their hands and not enough with their heads; they do not read enough; they do not think enough of what they do read; and *they do not rub together enough to keep the rust off.* Farmers have been at the foot of the hill long enough, and it is time they better informed themselves and took a little higher position.

We have added a new feature to our Club in the past year, and we find it works admirably, viz: coöperation in purchasing our supplies. We find we can save from ten to one hundred per cent, and even more in some things; and although it may be only a few cents on a particular pound or article, yet the per cent is such that in the aggregate it is a large sum, and if we had always realized one-half of *this* per cent on what we have raised on our farms, farmers could now and then have a *nice house and fit out*, as well as merchants and manufacturers, and the men in the professions. Verily, farmers must wake up, and I know of no agency so powerful in waking them up as farmers' clubs, and co-operation. A few live men in each community take hold, and the thing would be easy. *Then long life to farmers' clubs.*

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Officers for 1868: Matthew McIntosh, President; Reuben F. Dutcher, Recording Secretary; J. S. Woodard, Corresponding Secretary; A. E. Perrigo, Treasurer.

With many thanks for favors received, and hopes for their continuance, I am, very respectfully,

J. S. WOODARD, *Secretary.*

HIGHLAND.

HIGHLAND, *April* 6, 1868.

To the Secretary of the New York State Agricultural Society:

DEAR SIR—The exhibition for 1867 was held at Deyo's Hall, Highland, Ulster county, N. Y., on Thursday and Friday, September 26 and 27, and the strawberry show was held, June 14, at the same place.

The members usually donate their cash premiums to the Society; still this is optional with them. In this way we have been enabled to have more lectures than we otherwise could, and to procure for the use of the members a library of fifty-six volumes.

Our Society is more particularly horticultural, as the growing of small fruits is quite an important item in the industry of this vicinity; still some of the leading farmers of the place are with us. We have monthly meetings for discussions on various topics of interest. During the winter we have special meetings, two weeks after the regular one. The farming of the vicinity is of a mixed character. The ordinary rotation is to plow sod ground for corn, followed by oats; the next season with rye, sown in the the fall, and the ground seeded, to remain in grass as long as profitable for hay.

During the past winter, at the close of a discussion on the best methods of raising potatoes and the best varieties, the following was the preference as expressed by those present. That they should be planted in drills, and the potatoes cut into pieces, having about two eyes.

The Early Goodrich received	7 votes.
Peach Blow	5 "
Early June	3 "
Gleason	2 "
Pinkeye Rustycoat	2 "
Harrison (but little known here)	1 "
Prince Albert	1 "

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Rhode Island White	1 vote.
Oreno	1 "
Early Buckeye	1 "

The report of the treasurer for the year ending November 1, 1867, is as follows:

Receipts	$260 26
Disbursements	195 42
Balance on hand	$64 84

Officers for 1868: William H. Deyo, President; Cornelius A. Ransome, Secretary; Charles W. Elting, Treasurer.

Yours truly,

CORNELIUS A. RANSOME, *Secretary.*

IROQUOIS

CATTARAUGUS RESERVATION,
ERIE CO., N. Y., *January* 1, 1868.

HON. B. P. JOHNSON, *Secretary New York State Agricultural Society:*

SIR—In behalf of the trustees of the Iroquois Agricultural Society, permit me respectfully to submit the following report of the proceedings and condition of their Society for the year 1867:

Early in the year the trustees prepared and circulated a revised premium list, in which they aimed to secure a real advance in agricultural enterprise by stimulating the cultivation, not only of crops with which the Indians were already familiar, but of such others as might be expected to yield fair returns, and thus add to the resources of the farming community. In several of these there was a fair amount of competition, particularly in broom-corn and sorghum, of which several persons succeeded in raising very good crops.

The broom-corn found ready sale at prices quite encouraging to its cultivators, and the sorghum produced so good a quality of syrup that many of the Indians expressed their determination to plant it largely next spring, and many others expect to raise enough for home consumption. The bottom lands on this reservation seem well adapted to both of these crops; and the trustees hope the result will show the Society to have performed a valuable service for the people by encouraging their culture.

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It was the intention of the trustees to have their grounds, purchased last year, inclosed with substantial fences, and to have more suitable and convenient buildings completed in season for the annual fair; but the excessive drought which succeeded the spring rains rendered it impracticable for them to get their logs to mill and have their lumber sawed in time for the accomplishment of these objects.

The fair was held the second week in October, and was very successful. The show of grain and vegetables was pronounced by visitors to be superior to that of any other fair in this section of the State.

The potato crop was unusually good; and on one variety the judges reported that eight competitors were equally entitled to a first premium, and that they had never seen anything of the kind superior to their specimens.

There were few of the improved breeds of cattle on exhibition, but many fair specimens of grade and common stock.

There was some advance in the show of horses, and good time was made in several trials of speed. The premium offered for the best pair of walking horses called out five entries for competition, while there were twenty-six for draught and trotting.

The whole number of entries was 727, of which 396 were for the direct products of the soil; 198 for grain alone. Of the remainder, 188 were for skill and the products of skill, and 142 for living animals.

From the above it will be seen that the efforts of the trustees to make their fair something better than a mere horse show—to make it a place for real agriculturalists, rather than for gamblers and horse-jockeys—were, on the whole, attended with a satisfactory measure of success. Many visitors spoke encouragingly of the favorable contrast in this respect with the town and county fairs in this region.

There were a few good specimens of the products of mechanical skill, and one premium was awarded to an Indian blacksmith for the invention of a new potato-digger which promises to be useful.

The Indian women were not behindhand in their department. Their display of bead-work was exceedingly rich, and their specimens of needle-work of various sorts were quite commendable, while their improvement in the culinary art—bread, cake of many varieties, butter, preserves, &c.—proved them to be really exerting

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themselves to elevate the standard of household comfort among their people.

On the whole, the trustees think they see from year to year increasing evidence that the Society is accomplishing much for the promotion of good husbandry and the arts of domestic life among the Indians.

A rainy morning on the last day of the fair interfered somewhat with its pecuniary success; otherwise the receipts would have exceeded any previous fair of the Society.

The financial condition of the Society is exhibited by the following statement of the treasurer:

Balance remaining in the treasury after settling the expenses of last year's fair		$374 04
Expenses after the fair, previous to January 1, 1867, to be deducted		36 00
Balance on hand January 1, 1867		$338 04
Receipts from all sources during the year		1,090 19
Total resources of the year		$1,428 23
Paid out for premiums	$413 50	
Other expenses	314 32	
		727 82
Balance on hand January 1, 1868		$700 41

Officers for 1868: President, Moses Stevenson, of Irving, Chautauqua county; Secretary, Nicholson H. Parker, of Versailles, Cattaraugus county; Treasurer, Wm. Crouse, of Versailles.

All of which is respectfully submitted.

D. W. PIERCE, *Secretary*

KIRKLAND.

CLINTON, *January* 15, 1868.

Hon. B. P. JOHNSON:

DEAR SIR—The seventh annual meeting of the Kirkland Agricultural Society was held at Tower's Hall, in Clinton, on the second Wednesday of January, 1868. The exhibition in fruit and grain was in some respects better than on any similar occasion. Never were finer specimens of apples shown, and in grain, both of wheat and corn, nothing in Oneida county has of late been seen to surpass, if equal, that exhibited. The treasurer's report is as follows:

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Amount on hand at the beginning of the year		$164 39
Receipts of fair		347 77
		$512 16
Sundry expenses for tent, &c.	$144 68	
September premiums	158 00	
January premiums	19 00	
		321 68
Balance on hand		$190 48

Officers chosen for the ensuing year were as follows: President, T. A. Gruman; Treasurer, T. T. Thompson, Clinton; Secretary, George L. Miller, Clinton.

The sixth annual fair was held in the village of Clinton, Oneida county, on the 17th, 18th and 19th of September, 1867. The first day, as usual, was devoted to making preparations, entering stock and various articles for exhibition. Wednesday, the 18th, was the day of the show. The attendance was large, and the exhibition of stock as good as on any previous year. Indeed, we think, it was claimed that on no former occasions had as fine specimens of crosses and blooded Durhams been shown, two yearlings of these breeds being exhibited which weighed over —— pounds.

Our fair is not turned to a race course for the sake of drawing a crowd; yet, notwithstanding, we have as fine an equine display as can be boasted by almost any town. Blooded stallions, fancy teams, roadsters, young horses, colts and breeding mares compete for prizes, and some of them take the first premiums at county and State fairs. In sheep, swine and poultry, we claim an equality with other localities, except it be on the big breed of hogs, where we, perhaps, should have to yield the palm to some of our St. Lawrence and Lewis county friends; and yet we raise pigs here which approximate 400 pounds at ten months of age.

In the tent the show was creditable, though not as large as on some former occasions, owing in part, perhaps, to the excessive heat; and in part also to the fact that our fair was held before the products of the farm, garden orchards and vineyards were mature. Still, we had some very fine specimens of female handiwork, and some very superior displays of apples, pears, quinces and grapes, also of vegetables and flowers from our surrounding gardens. The fair inside the tent was continued Thursday the 19th, the afternoon of which was devoted to listening to an admirable address from Dr. Brown, President of Hamilton College. President B. has heretofore traveled in Europe, and was a careful observer of agricul-

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tural methods and results as there developed, and gave us the benefit of his observations and inferences, as drawn from his visit and conversations. I would gladly have sent you a copy for publication could I have obtained it for that purpose, but in its stead, I send you the humorous report of the chairman of the discretionary committee, Prof. Edward North, which you are at liberty to use at your discretion.

S. W. RAYMOND, *Ex-Secretary.*

LENOX.

To Hon. B. P. JOHNSON, *Secretary State Agricultural Society:*

The annual fair of the Lenox Farmers' and Mechanics' Association was held at the village of Oneida on the 3d, 4th and 5th of October, 1867. The first day was devoted to making entries and arranging articles in the halls. The second day the judges made their examinations and awards. The third day was to have been the grand day of the fair, but it proved unpleasant, and nothing was done on the grounds. The address, by the Hon. X. A. Willard, was delivered in the village hall to a large and appreciative audience. The speaker drew comparisons between the agriculture of England and the United States. Mr. Willard's personal knowledge of the subject added to the interest of the address. But for the rain of Saturday (the 5th) the fair would have been very successful.

Receipts	$903 81
Disbursements	837 69
Balance on hand	$66 12

The executive committee of this Association thought best to award as premiums, in many instances, agricultural books and papers. This was an experiment, but they were of the opinion that such awards would better subserve the interests of agriculture than to pay nothing but money as premiums. This course has given satisfaction generally, and will be continued. Although our fairs are generally well attended, there does not seem to be as much interest manifested in them by farmers as there should be. They are thought of too much as shows to entertain rather than instruct and aid the farmer. But we all hope, Mr. Secretary, that by continuing in well doing a change will gradually be effected for

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the better. Accompanying this you will find the report of our annual meeting. The box of books (Transactions) you sent me last year was distributed according to instructions from the executive committee. As there is no county organization in this county (Madison), and our Society is flourishing, we hope you will this year send us an increased number of copies of the Transactions.

Officers for 1868: President, Newell M. Chaffee; Treasurer, F. F. Hand; Secretary, Edward F. Lewis.

EDWARD F. LEWIS, *Secretary.*

LITTLE FALLS.

LITTLE FALLS, *April*, 1868.

COL. B. P. JOHNSON, *Secretary of the New York State Agricultural Society:*

DEAR SIR—I forward you to-day my eleventh annual report of the Little Falls Farmers' Club. This Society was organized nearly twelve years ago, and its semi-monthly meetings continue to be well attended.

Since the first organization of the Club I have, from time to time, made elaborate reports of its discussions, believing that a record of the experiences of some of the best farmers in the county should not be lost to the public.

The following pages are made up from my notes of the more important discussions before the Club during the past year. As we hold no annual fairs, these proceedings will best show what the Club is doing, and it is hoped will prove not without interest.

I have the honor to be, very respectfully, yours, &c.,

X. A. WILLARD, *Secretary.*

Annual Report.

FRIDAY, *April* 26.

At the meeting of the Little Falls Club the question under consideration was "Best material for roofing."

George W. Cleland, of Herkimer opened the discussion, and said that he had come to the conclusion that the various patents now before the public, such as gravel roofing, plastic slate, &c., were none of them so lasting or so efficient as good pine shingles He did not know where the material came from that was used for slating the roofs of the court house, but the slates of this section

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were not, in his opinion, adapted for the purpose, since they were affected by frosts, and readily decomposed. He believed that if a plastic slate roof was made from the Utica slate, it would wash away and become useless. He would rather use some other substitute for the slate—sand stone, marble dust, &c. These mingled with the gas tar, he thought, would make quite as good a roof as where slate was used. Another objection to this plastic slate was its cost. There must be a large profit on the roofing where the materials were so cheap. Gas tar could be bought for from fifty cents to one dollar per barrel; the slate was inexpensive, while the paper upon which the mastic is spread was very cheap, and would soon be cheaper than it now is. Why then should the cost of roofing with plastic slate be as high as good pine shingles? Should think some other substance could be used with the gas tar, and the patent avoided. As for gravel roofs, he did not know why the gravel found in this locality would not be quite as good as that from the sea shore. If it could be used it would lessen the expense materially.

The objection to gravel roofs is their great weight. They had been tried in this vicinity. Mr. Fox had put it on a roof, and it leaks. He thought that if green boards were used on the roof to be covered with plastic slate, the shrinkage of the boards will crack the paper upon which the slate is spread, and thus make a leaky roof.

Mr. Rust, of Herkimer, presented a letter addressed to the Club from O. G. Robbins, in which the merits of plastic slate roofing are enumerated. He states that its smooth, even surface and color makes it pleasing to the eye, and that it is light, weighing only about 150 pounds to the square, and consequently no extra frame work is required to sustain so great weight, as for gravel or tile. It is claimed to shed rain and snow so readily as to be easily kept light during winter; that it is impervious to air and storm, and being of one unbroken sheet, without seams or joints, is not subject to wind or storm driving through, nor leakage from back water, as is the case with shingles. Another merit claimed is that it is adapted to any shape of roof, with no fear of leakage from angles, flats, ovals, cornices, or gutters; that this kind of roofing is not affected by changes of weather, neither heat or cold causing it to expand or contract; that it cannot be injured by frost because it is a perfect non-absorbent, allowing no water to penetrate it. He states that the mastic is impervious to water from the first moment.

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of its application, and remains so; that the mastic will not wash off with rains when green, and that it hardens gradually, and finally becomes as hard as slate stone, of the same thickness, from the quarry. It also makes a fire proof roof, and this is regarded as one of its chief merits, since a large number of buildings are consumed every year by taking fire from sparks falling from chimneys, or cinders from adjoining burning buildings, on the tinder-like shingles, and this is one of the means of the rapid communication and spread of fires in villages. The cost of the plastic slate for roofing, it was said, is but little more than half the cost of tin or slate tile, and about the same, or a little more, than gravel. References were given to persons in Jefferson and St. Lawrence counties, who had made trial of the roofing and were, so far, well pleased with it.

Mr. Countryman, of Herkimer, stated that he covered a roof last fall with the plastic slate, and it had worked well. The roof was in a bad place, and only one coat of the mastic was used.

Samuel Green, of Frankfort, covered a roof with this material, last summer, and had found no leakage until recently. It resulted from an improper fitting of the felting or from nail holes. He said the boards should be nicely fitted and laid even.

To the question of Judge Graves, whether it could be put upon shingles, Mr. Green thought not, as the shingles make an uneven surface. The judge said he had put a gravel roof upon shingles and it worked well.

Mr. Whitman thought the slate cost too much; he saw no reason why materials which were said to be so cheap as those which formed this kind of roofing should make a roof as expensive as pine shingles.

M. Kinyon, of Middleville, said good pine shingles will last thirty years, and asked if there was any warrantee that the slate would last longer. The question could not be answered positively, as no tests had been made for that length of time.

Mr. Partridge stated that gas tar was used to a good purpose in making walks. The walks are first laid with coal ashes; upon this the coal tar, mingled with sand, is spread. Had seen walks which had been down eight years, and were now in perfect condition; the frost does not affect them.

In regard to plastic slate for roofing, reference was made to a statement by a writer in a recent number of the *Country Gentleman*, to the effect that all roofs of this kind would not stand. The

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gas tar rotted the felting in a short time, and cracks were formed which let in water, rendering the roof worthless.

The address of Mr. X. A. Willard now being in order, the discussion was closed, and the president, Hon. Harris Lewis, introduced the speaker, who occupied about an hour and a quarter on the "Comparative merits of European and American farming."

On motion of Judge Graves, a vote of thanks was given the speaker for his able and interesting address.

The following subject was then chosen for the next meeting: "Plaster and its application." S. S. Whitman, of Little Falls, to open the discussion.

On motion of Hon. Josiah Shull, of Mohawk, it was resolved that the Club meet hereafter, alternately, at Little Falls and Herkimer—at Little Falls on the second Friday, and at Herkimer on the fourth Friday of each month.

A NEW MILK AGITATOR.

A model of Austin's milk agitator was on exhibition, and elicited considerable interest. It consists of two floating rakes, one at each end of the vat, hung upon light arms, which are made to move slowly backward and forward in the milk by machinery propelled by a small water-wheel. The waste water from the vats puts the wheel in motion. It is claimed that this improvement effectually does away with the manual labor of cooling the milk at night; also prevents the cream forming on the surface thereof, thereby affording a greater yield of curd, and of superior quality. The affair is quite simple, and a statement was shown from Col. Seth Miller, of Lewis county, to the effect that he had used the apparatus in his factory, considered it of great utility, and highly recommended it.

CURE FOR FOOT ROT IN COWS

For the last dozen years or more, the cows of Herkimer and adjoining counties, have been troubled more or less with foot rot. The disease makes its appearance sometimes between the claws of the foot, often in the heel, and extending up the leg, causing extreme lameness, loss of flesh and loss of milk. It generally attacks one foot at a time, but will in turn sometimes go into each of the other feet. Constant pain seems to be present with this disease, and as cattle have not the courage and endurance of resistance, it soon materially affects the condition of the beast. It sometimes appears in only part of the herd, but often runs through the whole dairy. Whether it is contagious, or has been produced by some external

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cause, is not clearly ascertained. Some suppose there is a constitutional tendency to disease of the foot in cattle, resembling the rot in sheep. Many think it to result from cattle standing or tramping in the mud, or being kept upon moist land, but it attacks cattle alike upon dry pastures and those that have tramped in muddy places. It appears in different seasons of the year. We have known it to go through a herd in March, when the ground was frozen and covered with snow. It is often difficult to cure, and its appearance is becoming every year more common among the herds. Dairymen do not like to see the disease in the herd, because if the cows are not speedily relieved, they fail in milk and dry up. We have known a good many cases where cows have been attacked, and become useless for milk during the season. We have seen dairymen pestered all summer with this disease, not knowing how to get rid of it readily, and having a few cases under treatment all the time, until the whole herd has been gone through, and then perhaps it would attack some of the animals a second time. Various remedies are recommended in the books. Some of them are worthless, and others prove effectual only in certain cases. The question came up before the Club, and Mr. Whitman said he could give a remedy which he had never known to fail of making a speedy cure when properly applied. It was a very simple affair, and consisted of an ointment made of lard and red precipitate (oxyd of mercury). The thought had occurred to him that the disease might be caused by an insect burrowing in the parts, and producing the trouble, in the same way that the acari causes the itch. A cure is effected by destroying the insect. Whether the theory be correct is not important, but it suggested a mode of treatment which had proved eminently successful. The ointment was made a good deal stronger than that usually sold at the shops for the cure of itch. That was made by using one part red precipitate to eight of lard. He used for the foot rot, one part of the precipitate to four of lard. It was cheaper and better to purchase the precipitate and make the ointment at home. He usually took a quarter of a pound of lard, melted it and let it cool off until it began to thicken or was not in a fluid state, and then stirred in an ounce of the precipitate. He simply applied the ointment to the affected parts and rubbed it in. In bad cases, where the disease was in the heel and upon the leg, would apply the ointment and work it in by holding a hot iron near the foot. The foot should be cleaned previous to the application, by washing well with soap

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and soft water. Where the disease was between the claws, and the animal fractious, it could be rubbed in by drawing a rope through the parts. One application, if thorough, will generally effect a cure, but if all the parts are not reached by the ointment, apply again in forty-eight hours.

Hon. Harris Lewis said he had tried various remedies recommended for foot rot, such as corrosive sublimate, turpentine, spirits of salts, vitriol, &c., and he found nothing equal to this remedy, which was suggested to him by Mr. W. He thought it a very valuable remedy, and one that should be generally known. A knowledge of it would save large losses in the dairy region. It was a remedy very simple, easily applied, and would cure the most inveterate cases. He spoke of a case in his own herd, which had got under headway, and was extremely bad, before he tried the remedy. In that case, he applied the ointment several times, and it cured it.

Mr. Nelly, of Fairfield, said he had a great deal of trouble from this disease in his herd. Had never heard of the remedy proposed, but had been successful in treating the disease by cutting away a portion of the hoofs. He took a sharp chisel and mallet and cut off the toes of the diseased feet, until the blood spurted out freely. It gave relief, and the wound would heal up in a few days. He thought the disease the result of frost, similar to chilblain with children. The parts became highly inflamed and starting the blood freely, reduced the inflammation and effected a cure. Said that in cutting off the toes of cattle had often found pus in that part. Mr. Whitman did not approve of hacking off the toes of cows when there was a simpler and easier way of getting rid of the trouble.

PLASTER—TWO KINDS OF GYPSUM—THE HARD AND SOFT—WHICH IS THE BEST?

At a former meeting of the Club, a committee was appointed to look into the plaster question. The price put upon this article at the mills, is regarded by many as exhorbitant. It was understood that the various mills along the Mohawk had entered into a combination to keep plaster up at a high figure, making a uniform rate, and not under-selling each other. Much of the plaster was ground up wet or in a damp state, and some farmers thought that water at the rate of six dollars a ton was a rather expensive fertilizer. It would not pay, they thought, to haul water from two to six miles, to distribute over the land, especially this season, when they are getting every day a large surplus from another source. So a com-

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mittee was appointed to look into the matter and report. The com mittee are at work, and will compare notes and report in due time.

Their final report is looked for with much interest, since if it is found that there is a combination of plaster men to make farmers pay exorbitant prices, it is suggested there may be stock companies formed among famers to obtain their own plaster, and do away with some of the existing plaster mills. Judge Owen, of Herkimer, said he had been making some investigations in regard to this question, and gave an account of what he had learned from Mr. Ingersoll, who runs a plaster mil. near Herkimer, in regard to the cost of plaster, and the expenses of the business. We give his statement here for the purpose of calling out all the facts, though perhaps it ought to come properly in the report of the committee.

Before entering upon the plaster question, the Judge remarked that in seeding to grass he did not think so much seed is needed as was urged by some at a former meeting of the Club. He suggested a smaller quantity of seed, and mulching with manure, as a protection for the growing plants. He referred to a statement made by Charles Wightman, an excellent farmer of Herkimer, who said he did not care how dry the season might be, if he sowed plaster upon his seeding it would do well. Upon the Mohawk flats plaster does no good, and upon such lands, as a protection against drought, he would spread a light coat of manure on the seeding as a mulch.

Now, in regard to this plaster question, I went to the mill and got seven pounds of plaster, put it in the stove oven and baked it twelve hours, and the shrinkage was seven ounces, or about an ounce to a pound.

Taking as an estimate that Mr. Ingersoll sells 1,000 tons of plaster per year, at $6 per ton, his business amounts to $6,000. According to Mr. Ingersoll's statement, the 1,000 tons of plaster costs, at the banks in Onondaga, $1,500. The freight on a thousand tons by canal is $1,250; making it cost here on the canal $2.75 per ton. Then the hauling from the canal to the mill is 30 cents per ton, making $3.05 per ton when ready for grinding. The mill cost $5,000. Now, the repairs, taxes, insurance and interest at 10 per cent., amount to $1,090, salary of one good man, $600—making expenses so far, $4,650. Then to this add loss from shrinkage, $9\frac{1}{10}$ per cent., $422.24, and we have the expense account in all $5,062.24, leaving only $937.76 to Mr. Ingersoll for his labor, or about $1 per ton. He thought this did not more than pay the

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man for risk in the business, trouble, &c.; besides, being dusted up with plaster was not the most agreeable kind of work. After the above statement had been made, Mr. Ingersoll came in and went over the expenditures, &c., substantially as have been given. He said he was to considerable expense in cutting ice, and for repairs of water race, which did not obtain in other mills. He said the Little Falls plaster mills could sell 50 cents per ton lower than they did, and then make a greater profit than he. To a question from Mr. Whitman, in regard to a combination among plaster men to keep up prices, Mr. I. said that he had been told that there was such a combination, but he (Ingersoll) was not a member of the association. At the plaster banks there was an association of the kind, and they all sold at a fixed price.

He said there were two kinds of plaster, one much softer than the other, and he would like to know which was best. The soft made seven barrels to the ton, and the hard but six. The soft is of lighter color, and is easier to grind. A committee, consisting of Judge Graves, Mr. Lewis and Mr. Shull, was designated to make a thorough test of the two kinds, to see which was most efficient.

Mr. Shull said he found the soft plaster much finer ground, and about one-fifth more in bulk than the hard, in equal weights.

Judge Graves said he had a meadow upon which the experiments could be well conducted. He advised a trial of the two kinds upon vegetables, saying that no plant in the garden showed the influence of plaster sooner than lettuce.

FRIDAY, *June* 28, 1867.

CUTTING GRASS.

The discussion was opened by Hon. Josiah Shull, of Mohawk, who advocated the early cutting of grass. He had already made considerable progress with his crop, and if the weather holds good, hoped to finish by the middle of July. Had experimented in feeding hay made from early cut grass and late cutting, and had found the early cutting the best for stock. Stock would eat it up clean, while they would leave a part of that which had been cut when about ripe. When the two kinds of hay were placed before the cattle they always chose the early cut grass. There was more weight in the late cutting, but it was not so nutritious, the additional weight being made up of woody fibre of little or no value for food.

S. Earl, Esq., said he was satisfied that farmers generally cut their grass too late. Some of the farmers along the the West

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Canada creek had adopted the system of cutting the crop while the grass was green and juicy, and they were more successful than those who adhered to the old practice. He referred to a Mr. Hildreth who had adopted the plan with great success. He (Hildreth) took two crops from his meadows and obtained large yields. He sometimes did not get through harvesting the second crop until there were snow flakes in the air.

Judge Earl referred to the practice of Lewis Mead, a farmer of his acquaintance, who cut his grass very early, and in feeding his cows upon it in spring, was able to get three pounds of cheese per day from his cows, before turning to pasture.

Mr. S. Earl said that dairymen went to great expense in feeding grain to their stock in spring, which could be avoided and much money saved by substituting early cut grass, if pains were taken to have it cured and harvested in nice condition.

Mr. Countryman would commence cutting the crop about the 20th of June, and by cutting two crops a very large yield would be obtained from the land. He had taken off in this way at the the rate of four tons per acre.

Mr. S. Earl said he believed it was better for the meadows to cut early, and meadows were mentioned that had been spoiled by allowing the grass to ripen upon them before cutting.

Mr. Shull said there was no trouble about grass heading out twice during the season. Some kinds of grain would make two growths. In the spring he was short of feed for his horses and went to cutting a portion of a field of rye which had commenced heading out. The rye, on the parts cut over, sprung up again and headed out, and he got a crop of grain, but not so large as on the parts not cut over.

George Cleland stated that John MacDonald, of Warren, an excellent farmer, and one of the best in that town, gave it as his opinion that early cut grass made into hay was as valuable for fattening stock as the green grass of pastures. He (Cleland) disagreed with Mr. Shull in regard to the weight of early cut hay; he believed an equal bulk of such hay was heavier than that which was ripe when cut.

Mr. Shull had not made an accurate test of the matter, but said he had come to this conclusion from seeing the two kinds of hay in loads put upon the scales and weighed. There was no apparent difference in the bulk of the loads as they stood side by side, but

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when put upon the scales the late cutting outweighed the early by 500 pounds.

VALUE OF OVER-RIPE TIMOTHY AND CLOVER MADE INTO HAY.

Hon. Harris Lewis said he had a meadow from which he had taken twelve crops in six years, and during that time the annual yield had never been less than four tons per acre. The meadow is not depreciating, but is growing better and better; he believes in cutting grass early; believes timothy cut when over-ripe to be the most worthless of all the grasses; would prefer late cut clover by far.

Mr. Countryman and Mr. Cleland sharply combatted this assertion, stating that clover over-ripe made into hay was no better than pea straw, and almost worthless for feeding purposes.

Judge Owen said there was great difference of opinion among farmers in regard to the nutritive value of different grasses. Some writers who have been quoted as authority on the lactometer, at the recent milk suit, laid it down that sixty pounds of clover were of equal nutritive value to one hundred pounds of timothy. He had seen colts wintered upon the stalks of clover remaining after threshing the heads for seed, and they came out well in the spring.

Mr. Cleland interrupted by saying that the thing might be done in Canada, where they winter young horses upon wheat straw; or by farmers who are in the habit of tailing up their cattle in the spring; but he did not believe in the nutritive value of over-ripe clover or clover stalks.

The Judge sent back a sharp rejoinder, and remarked that the tailing up of cattle in the spring was not confined to the clover farmers, and that Canada furnished some good horses, notwithstanding the gentleman's slur. He thought clover straw altogether better than wheat straw for feeding any cattle. In this last he was corroborated by Mr. Cephas Johnson, an excellent farmer up the creek.

Mr. J. W. Davidson said there was no doubt about early cut grass being better than late cutting. Any one who would take the pains to test the two kinds in feeding stock, as he had, would be convinced, and could not help giving up their old notions if they had any.

Mr. Wilson said the feeding of colts upon wheat straw was not confined to Canada. Horses were wintered in this way in Western New York, and it was quite common in Seneca county.

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BEST TIME OF DAY TO CUT GRASS—NUTRITIVE VALUE OF EARLY CUT HAY.

Judge Earl raised the question as to the best time of day to cut grass, and whether it was advisable to cut in the morning when the dew was on.

Mr. Johnson would commence cutting in the afternoon (after two o'clock), and not mow it till next day, when, as soon as the dew is off, stir out, and, if ready, rake and haul in. If not dry enough the second day, cock and haul in as soon as fit.

Mr. Cleland would commence cutting early in the morning, and as soon as the dew is off commence turning with the tedder. Then, if not ready, rake and cock.

Judge Owen would cut in the forenoon, and not after three o'clock, P. M. Then commence with that which was first mown and rake with a steel-tooth horse-rake. Cock and take in next day. He said there were various opinions about cutting grass early, and it was claimed that such hay made the most milk, but there were others who did not believe in it. He referred to a Mr. Reed, who was well known as a successful farmer, who was in the habit of cutting his timothy so late that many farmers talked about it deridingly, and yet Mr. Reed's stock came out in the spring in capital condition, and they were wintered through on only three-fourths of the quantity that others were using. He believed this early cutting of grass was often carried to extremes. The plants were immature and less nutritious than if left standing until a later period. It was a law of nature that half-grown, immature fruits and plants were not as nutritious as those fully grown and mature. A green apple was not worth much. Sorghum will not yield sugar if cut green. He had a field in oats, which were cut green and cured for fodder; the cattle did not like it. Had rather have one acre of corn-stalks with the grain on, than three acres cut green. The difference in feeding with the two was about like feeding sound corn and pig corn; and so with grass. If grass is cut for hay as green as it is now, it will be of much less value than it would be if left to stand and cut later. He wanted his grass fully grown before it is cut; would mow it just before fully ripe.

Mr. S. Earl would cut grass just before it got its full growth. If left to stand as long as advised by the last speaker a considerable portion of the stalks would be dried up, and there would be a loss from woody fiber. Did not believe in the theory of the gentleman. If his theory was correct, it would not be advisable to turn cows

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out to pasture, since the grass must be quite immature and not nutritious, &c.

Judge Owen replied by saying that he did not make the statement that the plants were void of nutrition. He spoke of the two cuttings comparatively—the one as less nutritious than the other. An acre of good, full grown grass made into hay, would afford a cow food for the same length of time that two or three acres would if in a pasture. If corn was to be sowed for fodder, the best results would obtain by letting it stand until the ears ripened upon it.

CUTTING AND FEEDING CORN STALKS.

Judge Earl referred to the practice of A. L. Fish, of Winfield, who advised the sowing of corn for summer soiling and for fodder. Mr. Fish claimed to have been very successful in obtaining large yields of milk and a large quantity of cheese per cow, by this system.

Judge Owen did not regard the advice of A. L. Fish as of much value. He referred to the practice of Jacob Strong, of Illinois, who was a very successful stock breeder. The corn was left to ripen in the field, then cut and shocked and fed from the shock to the cattle. No better fat cattle were made than these under the management of Jacob Strong. He had no doubt but that four cows could be wintered upon an acre of corn fed out in this way. Thought the best way of testing this question, was to take two acres of grass, cut half of it on the 20th of June, and the other on the 20th of July, and then see which is best.

EARLY CUT HAY VOTED THE BEST.

Mr. Lewis prefers cutting grass just before it gets its growth, just as the first blossoms come out. When two crops are taken off the first crop is best; rowen is not so valuable as first crop.

Mr. Johnson would cut just as the blossoms are falling. Hay is not so dusty.

Judge Earl offered the following:

Resolved, That all things being considered, it is better and more profitable for dairymen to cut grass before it is out of blossom than to cut it at a later period.

A vote being taken on the above (only a few present voting), the vote stood nine in favor and one against the resolution.

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CUTTING GRASS WHEN THE DEW IS ON.

The following was also offered by Judge Earl:

Resolved, That it is unwise to cut grass in the morning, before the dew is off, as a general rule.

Mr. Schull said it did not pay to keep a lot of hands idle in haying to wait until the dew is off before commencing work. He believed in striking out early in the morning, mow till 11 o'clock, then after dinner rake and cock, making the cocks so they will shed rain. Next morning, after 10 o'clock, throw the cocks open, and at 2 o'clock commence hauling in.

Mr. Johnson said the question was not what is most profitable for the men to work at, but what is best for the hay crop. He reiterated the advantages of cutting late in the afternoon, and said the men need not be idle, but could be set drawing in the hay left over the previous day.

Mr. Countryman prefers mowing in the afternoon and evening; use tedder next day, and if dry enough, haul in.

Mr. Joslyn cuts in the afternoon; let it lie till next day, and when the dew is off stir with tedder, rake and haul in, if ready, and if not, cock up.

Mr. Lewis suggested the use of two wagons and two rakes; would have as many rakes as horses. When you take off horses from wagon to rake, use both upon the rakes.

Mr. Whitman, who came to the meeting at a late hour, being called upon, said he would cut grass early. Farmers, he found, were more and more impressed with the importance of having nicely cured early cut grass for spring feeding. Would cut when grass is in bloom, and after the dew is off in the morning; and when the piece designed to be mowed is half down, put in the tedder and keep it going.

GRASS CURED IN ONE DAY BY USING THE TEDDER.

He said grass could be cured in one day, even now, as green as it is, by the use of the tedder; had cured rowen in the short days in the fall with the tedder, and every one knew how difficult it was to cure that character of grass late in the season. The tedder was a grand labor saving implement; it not only saved labor, but it saved hay, and its use during the season avoided considerable losses. He preferred the spring tooth horse rake to the old revolver—it picked up the scatterings better.

Messrs. Countryman and Lewis spoke of the tedder as an indispensable implement in the hay field.

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A vote being taken on the resolution, it stood nine in favor to three against, only a few, as before, voting.

SALT AND LIME FOR CURING HAY IN THE MOW.

Mr. Joslyn stated that he had been very successful in treating hay with salt and lime mixture. To four quarts of salt add two quarts of lime; mix, and of the mixture use three quarts per ton of hay; scatter over the hay in the mow, when the load is half off, and again when the load is off. Commenced using this mixture seven years ago, and since that time has not had a sick horse or cow. The hay can be put in green and comes out green, and with no dust. Horses fed on such hay do not have the heaves; his horses used to be troubled with heaves, but have not had any of this trouble since he commenced using the salt and lime.

Mr. Whitman said the question of salting hay had been discussed by the Club, and the conclusion arrived at was, that it was not advisable to salt hay in the mow. Mr. Reid had serious losses from this cause. In regard to the mixture referred to by Mr. Joslyn, he would put in less salt and more lime; was not in the habit of using salt on hay.

ANOTHER REMEDY FOR HEAVES.

For heaves in horses would recommend sumach bobs, especially for horses that were commencing to have the disease, it stopped their coughing. Sumach bobs were well known for their medicinal qualities. The Thompsonians used them for sore throat; had usually gathered the bobs in the spring, but any time when fully ripe would do. A handful now and then mixed with the oats or other feed would do for the horses.

Judge Owen would not advise the use of salt and lime for curing hay in the mow. As to the heaves, horses at the West were free of this disease, and farmers there attributed it to the rosin weed. He thought a little rosin used in the feed would serve the same purpose as sumach.

Mr. Lewis did not approve of the use of salt on hay in the mow, nor to the use of lime. He thought the best way of feeding salt to stock was to have it in some place where it was at all times accessible to the animal.

Mr. Johnson said he did not salt his cows in the winter.

Dr. Haigh, of New York, one of the persons appointed to conduct the investigation on abortive cows, was present, and gave a short address in regard to his mission, and the facts at present

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sought to be obtained. There were several persons present who had lost largely from this trouble, and considerable talk was had upon the subject.

The Club holds but one more regular meeting before its usual harvest adjournment. This meeting will be held at Little Falls on the second Friday of July, when the question of fertilizers including waste materials from the factories, will be discussed. Warren Miller, of Herkimer, was appointed to open the discussion, and George Cleland alternate.

FRIDAY, *July* 12, 1867

PAPER-MAKING FROM STRAW.

The discussion was opened by Mr. Miller, of Herkimer, who is largely engaged in paper manufacture. He said the question of utilizing the refuse material from paper mills had occupied the attention of paper manufacturers and others for some time. The manufacture of white paper from straw has now been going on some ten years. From the commencement of the business to the present time the trade has been increasing, and now seventy-five tons of paper per day are made from straw. It takes two tons of straw for a ton of paper. The business is confined to the States of New York, Massachusetts, Pennsylvania, Maryland, Delaware, and Illinois. Nine-tenths of the printing paper made of straw is produced in New York, Delaware and Pennsylvania. An immense amount of money has been spent to retain the alkali used in paper manufacture, and make it subserve some useful purpose. There is about fifty-five per cent of waste in the straw. Soda ash is used in large quantities in the preparation of the straw for paper, and it is allowed to run to waste after serving that purpose. In every pound of paper there is a waste of half a pound of soda ash and one pound of straw. The soda is not injured, but is so combined with the various parts of the straw that no way has as yet been discovered by which it could be profitably separated. It could be separated by evaporation, but the expense was about as much as the soda was worth. At Herkimer, they are using 2,000 tons of straw per year, or an average of about six tons per day. There is daily there a waste of three tons of straw and 2,400 pounds of soda ash. It is thrown into the stream and passes down the creek. This waste contains everything belonging to the straw except the fibre.

A ton and a half of straw is put in a boiler holding 1,800 gal-

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lons of water, containing 600 pounds of soda and 400 pounds of lime. About 1,500 pounds of lime per day is used at the mills, and the lime is allowed to run down the stream, and is in consistency like paste. It is the real carbonate of lime; we give back to it carbon and it runs off in the condition of limestone pulverized. It is not mingled with other matter but passes off separately. We have daily 7,200 gallons of liquid in which is all the silica, all the starch, gluten and everything belonging to the straw, except its fibre. To every gallon of this liquid there is one pound of vegetable matter belonging to the straw, and a third of a pound of soda ash, making one and one-third pounds of valuable material that goes to waste.

Some experiments had been made at Fort Edward to utilize this material for agricultural purposes. Muck was drawn out and the liquid poured upon it, but am not able to give the result. The liquid as it passes off to the stream is too strong to be applied directly to plants—unless it is diluted it kills them.

Another experiment was made under his (Miller's) direction. There was a large pit near the mill where the knots and dirt blown out of the straw by the fan-mill were piled. Upon this mass the liquid was thrown and the mixture spread upon sandy land sown with oats. It was spread over the land like manure, and wherever it was put it killed the oats. In the fall the piece was seeded to grass, and there was a large growth. It was too strong for the oats.

VALUE OF SODA AND POTASH IN AGRICULTURE.

Mr. M. referred to Johnson's Agricultural Chemistry and quoted his remarks in regard to the value of carbonate of soda and carbonate of potash. According to Johnson, carbonate of soda was worth fifty-five dollars per ton for agricultural purposes. It could be applied profitably to grass lands that were mossy, or that contained a superabundance of vegetable matter; also upon sour lands. It could be applied beneficially upon fields of grain, or wherever ashes can be profitably used. Wood ashes contain potash; this and soda ash, said Mr. M., have the same essential nature in the arts. In preparing straw for paper we can use potash but it is too expensive. Johnson says that many experiments show that both are valuable to the agriculturist, but the quantity to be used depends upon the soil and the character of manuring to which it had previously been subjected. He gave the analysis of rye and

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rye straw, showing the quantity of soda required in a thousand parts, and the proportion of silica.

Every farmer knows that in grain grown on low lands the straw is weak. In this liquid we have not only the silica, but the soda that makes it soluble. The alkalis are the only substances which will render silica soluble. Even if the propotion of the silica in the liquid is small, we have the alkali which makes silica soluble, thus putting it in condition to be available for plants. There is sixty-seven pounds of silica in 1,800 gallons of the liquid. Every plant needs soda and silica, and it must be presented in a form that is available. Johnson says that soda ash may take the place of potash, and that carbonate of soda has been found of benefit to the buckwheat crop. The great value of this waste liquid is that it decomposes manures and vegetable substances. By the use of the alkali, they give up those elements necessary for the growth of plants. In other words, it puts land in a ferment, or condition to force forward the rapid growth of plants. Rank vegetable matter may be compared to uncooked food, and the alkali prepares it to be taken up by plants, yielding to them nutrition. If there is scarcely any vegetable matter in the soil, there is little for the alkali to act upon, and it is a matter of experiment whether it would be of any advantage to apply it to sandy soils. The silica would be rendered soluble, and as the liquid contains three times as much vegetable matter as soda, something might be added from this source.

Mr. Miller here quoted from Johnson as to the value of silica in the process of vegetation, and said the only way to get it in a form by which it can be used by plants, is through the agency of an alkali of either potash or soda. The whole system of making paper out of straw, was the discovery that it could be dissolved by an alkali. If lands are manured with half rotted manure, plants do not grow rapidly, but if an alkali be added, the effect on the growth of plants will be very marked. Potash and soda are the strongest of all alkalis. Lime and magnesia come next. The alkalis are valuable not only in giving directly what the plants require, but in preparing other matter for their use by rendering it soluble. He would advise an application of the liquid on the land before the seed is sown, or in a diluted form upon the growing plants, so that it may come in contact with the roots. He thought the liquid could be used to good purpose upon lands for the purpose of destroying weeds.

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As 7,200 gallons of this liquid were run down the stream from his mill at Herkimer as waste material, he would be glad to have farmers experiment with it. They could have all they wanted, at no cost. He said some experiments had been made to utilize this material in soap-making, and the stream, while running off the liquid, presented the appearance of a mass of soap suds. The water at these times was excellent for washing clothes. It readily cleaned them of dirt.

GROWING RYE STRAW.

Mr. Miller said that although the growing of rye straw was not before the Club for discussion at this meeting, yet he would beg the indulgence of members for a few words on the subject. As previously stated, the making of white print paper from straw was commenced at Fort Edward in 1857. At that time rye straw could not be procured in sufficient quantities to keep one mill running. The farmers began to grow the crop in Washington and Saratoga counties, and now ten large mills are in operation, using in the aggregate 15,000 tons annually. The straw at these mills, for the past five years, has averaged less than $15 per ton, and $225,000 are brought into those counties for straw alone. Then there is the value of the grain. It was a poor farming district before the introduction of rye-growing, and now the farmers were making good incomes. We are using at Herkimer six tons of rye straw per day. Matthew Smith, of Frankfort, grew last year on an acre of land, and from two bushels of sowing, 47 bushels of rye, for which he got $1.20 per bushel, and two tons of straw, which were sold at $24. This makes $80.40 as the yield from one acre, which may be considered a very profitable crop. He thought the farmers of Herkimer would find it to their advantage to grow rye in connection with the dairy. He said we are using 2,000 tons of straw annually, and are forced to get our supply from Schenectady. It comes in bales. Rye straw is worth from $24 to $30 per ton in New York city, and is of ready sale. At the mills east they pay $20 per ton for it. All along the Hudson rye is the principal grain crop.

ROTATION OF CROPS IN GROWING RYE.

They have a system of rotation in crops which is found to work well. It consists of potatoes, then rye, when the land is seeded down and mowed for two or three years. Sometimes rye is sown upon the sod. The prodnction of potatoes in that section is immense; there are several starch mills in operation which use up

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the crop. If the Herkimer farmers would commence growing rye, they could always find a good market for the straw. If the supply was beyond the consumption at his mill, other mills would be erected. The water privileges in the valley of the Mohawk and about this section are unequaled, perhaps, by anything in the State, and there would be no difficulty in starting mills, if the material was at hand, for the production of paper. But there is always a good market in New York city and in other cities for rye straw. The Washington and Saratoga farmers say that if they can get their seed back the rye straw pays a good profit, after paying interest on land, labor, &c. In the town of Frankfort they are raising as fine rye as he had ever seen, and there can be no doubt the county is well adapted to the crop.

Mr. S. S. Whitman, of Little Falls, said he had learned by experience that it was necessary to exercise care in the application of fertilizers. He had applied manure from beneath his stables to melons and cucumbers, and it killed the vines; had tried gas lime upon meadows, and it killed the grass. The truth was that too much was applied; it was too strong, and should have been diluted.

BONES AND BONE MEAL.

The president introduced Mr. Olney, of Southbridge, Mass., manufacturer of ground bone and bone dust, who made a brief statement of the value of this fertilizer. At the East, bone manures are coming largely into use. Formerly there had been great trouble from grain rusting, but he had never heard of rust attacking a piece of grain raised on bone. We always warrant our bone manures to keep off rust. As a top dressing he would advise the use of fine bone, but where it was to be worked in the soil, coarse bone would be more economical. On the Connecticut river they have been using guano as a special manure. Its operation is very quick, and the land has been worn out from using it. They are now using bones, and with the best result. Bones are very lasting as a manure. An application of from 400 to 800 pounds per acre gave good results for nine years. For gardeners nothing was found to forward vegetables with such rapidity as a good article of phosphate. The great trouble in this class of fertilizers has been in the difficulty of getting a reliable article. Farmers at the East say they can buy phosphates and use them as cheaply for the corn crop as the cost of dropping barn-yard manures in the hill. In addition, the phosphate hastens the ripen-

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ing of the crop at least ten days to two weeks. He gave several instances where persons had used this fertilizer, and were so well satisfied with the result that henceforth they should use large quantities.

He spoke of a farmer who had a low, wet piece of land that was not producing anything of value. He boned it at the rate of 400 pounds to the acre, and it brought in a luxuriant growth of white clover and the finer grasses. This was the universal testimony of farmers who had applied it to this character of lands. Upon dry lands the bone was longer in decomposing than upon moist soils.

At the East, we do not think composts are economically made, unless under cover. The liquid referred to by Mr. Miller as waste of paper mills, is considered of value in composting. He spoke of an instance where a farmer had used it in its undiluted state to kill out weeds and worthless vegetable matter. It put the ground in splendid condition, destroying every weed.

FEEDING BONE MEAL TO STOCK, ETC.

He spoke of the use of bone meal for milch cows, and its benefits in warding off disease. Had never known cattle which had a plentiful supply of bone meal to be attacked with murrain. Young and growing animals were very fond of it. Calves would gladly lap it from the hand. There was no danger in feeding it. Cows would eat what they required, and no more. Those that did not need it, would not touch it. He thought dairymen would do well to feed this article to cows, since they were called upon to supply a considerable quantity in their milk, and in the production of their young. There was a difference between milch cows and oxen in their appetite for bones. Had never seen or heard of an ox picking up and trying to chew a refuse bone, whilst with milch cows it was quite common. He spoke of a disease among cattle at the East, called "cripple aile." The cows become weak and crippled—they would get down and could not rise, and would die. Bone meal was a sovereign remedy for this disease. A farmer of his acquaintance, recently had a case; the cow was down and he expected to lose her. The case was mentioned to him (Olney), who sent the man down twenty-five pounds of bone meal. As soon as the meal was in reach of the cow she ate it greedily, and in a short time recovered.

At the manufactory a very clean, good article was manufactured

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especially for stock feeding. He thought farmers generally, and especially dairy farmers, had neglected the investigation of the question of bone fertilizers.

Mr. S. S. Whitman, of Little Falls, who is agent for the sale of Bullard's hay-tedder, said he supposed this bone material was some thing like his tedder—the farmers who understood their value could not do without them.

Mr. T. G. Hollingworth, of Utica, gave a statement of his experience in boning land, and the result. The yield in every instance, where it had been applied, was very large. He presented a sample box containing ground bones in different degrees of fineness, and also bone meal for cattle, and said he was prepared to furnish farmers with the article.

Mr. Whitman offered a resolution thanking Mr. Miller for his address and liberality in offering the waste material from his paper mill to farmers free of cost.

The subject of fertilizers was continued over for discussion at the next meeting at Herkimer, on the fourth Friday in August, Peter Countryman, Esq., of Herkimer, to open the discussion.

FRIDAY, *August* 23.

FERTILIZERS.

The meeting of the Club at Herkimer village, on Friday, August 23d, had under discussion the subject of fertilizers. This subject had been continued over from a previous meeting, at which it will be remembered the waste of paper mills, bone dust, and some other fertilizers had been considered. Mr. Whitman, of Little Falls, one of the persons appointed to open the discussion, said he had expected to hear from Mr. Countryman and Mr. Cleland. He was not aware, until seeing his name announced in the papers, that he was among the speakers appointed to open this discussion. The other speakers, however, not being present, a few suggestions might perhaps be offered by way of breaking the ice for others, but he could give nothing except that coming under his own observation.

The question as discussed at the last meeting did not touch upon the ordinary manures used upon the farm, but was more particularly directed to the waste of villages, and from the mills, &c.

When we speak of manures, it is a question whether we all understand the term alike. If we use the word to represent matter used by plants in their growth, it is a question whether the

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fresh excrement from cattle, for instance, is manure. He did not consider matter of this kind manure until it ferments and decomposes, or, in other words, has assumed a condition which renders it available for plants. He did not believe a plant could take up undecomposed dung; and hence, if this principle be admitted as a starting point, we can understand why farmers often fail in obtaining results expected from the application of what are termed manures.

At the last meeting, Mr. Miller gave a very interesting account of fertilizing materials which go to waste at paper mills. There is perhaps as much or even a greater waste at the woolen mills. If we could utilize the soap suds that are thrown into the stream from the woolen mills, great benefit would result from their use upon the farm. Then there is the oil, or yolk, washed out of the wool, and the fertilizing materials out of which the dyes are made. All of these are valuable, but the difficulty is to get them in a shape that they may be easily carted out and applied to the land.

There is other fertilizing material thrown away at the mills—the flocks, or waste refuse of the wool. This makes a very valuable manure. There is one objection to its use—it contains a burr, the seeds of which might get scattered upon the land and vegetate. This, however, may be avoided by piling up the wool flocks in heaps and allowing the mass to heat and decompose, so as to spoil the germ of the seeds.

There is another waste of fertilizing material now largely going on in villages and cities—coal ashes. The majority of farmers think they are of no account, but they are very valuable for clay lands.

The lime from paper mills and the gas lime from the gas works can be turned to good account when properly applied. We this year spread about 1,000 bushels of gas lime upon our meadows, and we think it has paid largely in the increase of the crop.

At first we did not know how to apply it, and by putting on too largely the plants were destroyed. Judgment is needed in the application of all fertilizers, and especially with material like gas lime. We drew the lime out upon the farm in the fall and winter, and put in heaps. In the spring we spread it by going through the meadow with the load and throwing from the wagon a shovelful from time to time as the team moved along. By giving the shovel a sweep or kind of flirt, the lime may be scattered quite evenly.

Have used waste wool to some extent, and find it a good fertil-

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izer; consider it valuable when applied about fruit trees. Too large a quantity should not be used, as it mats together and sheds the water. The better way in its application is to mix it with earth. I find it excellent for cucumbers. The wool, in the process of decomposition, gives off considerable heat, which is also of service to the plants.

Have used hundreds of loads of hair from the tannery. Its action, when spread broadcast, is slow, but you get an immediate effect from the lime mingled through it. The better way to apply hair to land is undoubtedly to plow it in. I went down and talked with Hon. Zadock Pratt on this subject. You know that Mr. Pratt has made quite a stir through the papers in his accounts of butter dairying in Greene county. Well, I asked Mr. Pratt how much his land owed for its fertility to his tannery, but he would not answer the question. However, I got this from him, that in the application of hair, the best way was to plow it under, and my experience corroborates this.

Hair is an excellent manure for turnips and cabbage; have tried it in various ways; have made a hole with a spade and put in a double handful of hair, covered it with earth, and then planted the turnip seed. When the roots of the turnip get hold of the hair, they hang to it with a tremendous grip, and the bulbs grow and fatten upon this kind of food rapidly. They grow better on this manure than upon the richest stable dung. The hair makes a valuable manure also for cabbages, and it serves a good purpose also in keeping off worms.

HOW AND WHEN TO TOP-DRESS MEADOWS.

Judge Earl desired the opinion of the Club in regard to the best time for top-dressing meadows. Some farmers top-dressed in the spring with fresh manure; others hauled out and spread manure in the fall. He thought the practice was becoming more general of hauling out fresh manures in the winter or spring, and using as top-dressing, than formerly. Many farmers had the impression that a greater saving was effected by getting the manures out in this way; in other words, that the loss from evaporation, &c., was less than when the manure was left to decompose in the heap.

To this question a member said he believed the best result from top-dressing meadows was obtained by using well rotted dung. Let it be applied immediately after haying, using a brush to brush it down fine, so that it may be distributed evenly, and reach all the

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plants. If a sprinkling of plaster be sown immediately upon this top-dressing, it fixes the ammonia and prevents loss. The manure also served to protect the roots of grass from the rays of the sun, which often acted injuriously upon meadows after the grass was cut.

Mr. Whitman said he should always prefer that manure for top-dressing be drawn out and piled, and after being thoroughly decomposed, applied. He did not believe that pastures derived so much benefit from the droppings of stock as many imagined. Better results would be obtained if the cattle had been kept up, and their excrements placed in a heap and applied in the way he had suggested.

Hon. Josiah Schull also believed this to be true. Every one in passing over pasture lands must have observed that the droppings of cattle during a part of the season were dried up in a thin, hard flake, through which vegetation could not make its way. Later in the season, when there is more rain, this was not the case.

Harvey Lewis referred to a Mr. Blood, living in the vicinity of Herkimer, who had kept this summer 11 cows, a bull and a horse upon two and a half acres of land. The stock was kept in a yard and soiled. The land had been cut over several times to furnish the necessary food during the season, but the stock had been kept. This fact might suggest the question whether our farmers, ordinarily, were getting the best results that could be had from their lands. Mr. Lewis remarked that the great question among farmers was how to keep up the fertility of lands with the ordinary manures made upon the farm. For a series of years he had been enabled to keep lands in good heart by sowing plaster in the spring, and using the ordinary manures from his stock—breaking up their droppings, so that these may be available to plants, and not go to waste.

Judge Owen referred to the use of the clover plant as a fertilizer. He thought some system of agriculture should be resorted to by which our lands may be kept up with the ordinary manures made upon the farm. This he thought could be done by judicious cultivation, and by more attention to working the soil and seeding. He believed that many of the farms of Herkimer were deteriorating. He was acquainted with farms of one hundred acres that a few years ago carried twenty-five cows, and now were carrying only fifteen. Did the farmers upon such lands make the best use of the manures at their command? The question was an important one, and its solution should occupy the attention of all thoughtful farmers.

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Some years ago he owned twelve acres of Mohawk flats—it had been severely cropped, and was poor, perhaps the poorest piece of land on the Mohawk, He purchased four hundred loads of stable manure, and applied it in a fresh or raw state, and with but little improvement to the soil or crops. Then he looked about for another course of treatment, and purchased a thousand yards of well rotted dung. It was all in one pile, and had been accumulating for five years. It was at a barn that stood six feet above the surface of the ground, and the manure had been thrown out until the accumulation had reached the sills of the building. Straw had from time to time been thrown upon the excrement of stock, and this had prevented evaporation, making a solid mass of rich manure. This material was carted upon the land and we saw the effect—it turned the field into a garden. This experience convinced him of the value of rotted over unrotted manures.

GROWING WATER-MELONS.

A portion of this field, some two rods wide by seven rods long, was plowed for the purpose of setting fruit trees. It was plowed a foot deep, and the clay subsoil was turned up. Thought it might as well be planted, and put on water-melons. The plants came up, but the sun dried and hardened the clay, and the vines did not thrive. He then went to the dung heap and took from the centre a wheel-barrow load of manure that had thoroughly decomposed into a black mass. This was thrown into a barrel filled up with water. Commenced watering the plants with this liquid, and directly they began to grow vigorously. Thinned out the plants to two in a hill, and continued the application of the liquid, filling up the barrel with a fresh lot of manure and water from time to time. When the plants got fairly under way they would make a growth of ten inches in twenty-four hours. Finally thinned out, leaving only two plants, and they in time covered all the ground. These made an enormous yield. One of the melons weighed twenty-eight and a half pounds; six others weighed one hundred and twenty pounds. From this patch we picked all the melons we wanted for family use, and for the entertainment of friends, and to close up in the fall, we took off half a dozen wagon loads of unripe melons. This satisfied me that the best way to apply manure to vegetables was in a liquid state.

Now, about the application of refuse wool. My brother manured ten acres of meadow with wool flocks that had been left in a heap

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to heat and decompose. It had a most wonderful effect, renovating and enriching dry barren knolls.

COAL ASHES ON THE FLATS.

Mr. Weber said his father had made an application of coal ashes upon the Mohawk flats. The meadows, upon which the coal ashes were applied, gave a much larger yield than those not treated. The difference in the grass while growing was as apparent to the eye as upon uplands where plaster had been used.

LIME.

Mr. Harvey Lewis said that lime from the paper mill had been used on land near Herkimer village, without any apparent benefit.

Mr. Whitman referred to a large heap of refuse lime at Little Falls, and said Judge Loomis of that village had consulted with him in regard to its value, and whether it would pay to cart several miles upon his (Loomis') farm.

He (Whitman) thought not, as the said lime was full of stones and filled with water. Had advised Loomis to burn lime-stone upon the place, as not only better, but cheaper. The lime then should be slaked with brine.

Mr. Willard remarked that many soils contain lime enough for the use of plants, but in others it is deficient; hence the different result which we see in its application.

Lime is an important constituent of plants, but apart from this, it affects the mechanical and chemical condition of the soil. It is a decomposing agent, and hastens the decomposition of vegetable matter, causing it to give up its constituents for the use of plants. Lands that were mossed over, and which had a superabundance of vegetable matter, are often greatly benefited by the application of lime. He referred to an old orchard in meadow, mossed over and unproductive which had been brought to yield large crops, simply by an application of lime.

Lime affects the various inorganic compounds in the soil, so that they lose their power of holding together and crumble, or are reduced to fine particles. In this way it improves the mechanical condition of the soil.

By slaking the lime with brine, as suggested by Mr. Whitman, we get a better class of agents for decomposing organic matter than by the use of either the lime or salt alone.

The chlorine of the salt unites with the lime, forming chloride of lime, and the sodium after being freed of the chlorine unites

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with the oxygen of the air and forms soda, which combining with the carbonic acid of the atmosphere forms carbonate of soda. When properly made, this is a very valuable mixture for the decomposition of muck and the compost heap.

MORE ABOUT WELL ROTTED STABLE MANURE.

Mr. John Golden, an old and experienced farmer of Little Falls, thought it better to top-dress meadows with well rotted manures in fall, than to use fresh manures in spring. He likes to have it spread early in the fall, and would prefer moist weather.

Mr. Schull said he had often observed when fresh manure had been drawn out and plowed under in spring and then turned up in fall, it would be full of worms, and no benefit received from it that year. He thought there was great advantage in hauling the manure out in heaps, where it should remain until well rotted.

Judge Owen never knew a farmer who had once got in the habit of hauling manure in piles, and applying it to land in a well rotten state, that went back to top-dressing with fresh manures.

POUDRETTE.

Hon. J. Schull inquired in reference to the value of poudrette, and whether it was advisable for farmers to purchase and apply it upon farms.

Mr. Whitman said there was no doubt as to the great value of a good article of poudrette. We make it by mixing with the night soil copperas, charcoal and muck. When thus made, it is a very powerful fertilizer. But the poudrette of commerce is of very doubtful character. Had purchased some, and found it nothing more than the sweepings of blacksmith shops; or horse droppings, mingled with dust and dirt. Such poudrette was of no account.

Judge Owen said he had purchased some of the fertilizers put up under the name of Professor Mapes. He had rather have a load of dung—which, as commonly sold, would cost one dollar, than five dollars worth of this prepared fertilizer.

Mr. Schull said he had been using poudrette the present season, but could not see any effect from it as yet. Had tried, alongside of the poudrette, a compost of hen manure, and its effects were very marked.

Mr. Whitman said it was always advisable to compost hen droppings with muck or dirt, since its application alone was too strong for plants. He knew no plant that would bear strong manures so well as the pepper; it would bear an application of hen droppings, which was often as strong as guano.

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PLOWING OF WEEDY LANDS RECOMMENDED.

Judge Owen referred again to the necessity of plowing up and cultivating grounds overgrown with weeds and not producing. He knew of lands in pasture where six acres would not keep a cow respectably. It was grown over with moss and silk-weed. Such lands had better be plowed at once and put in condition to yield a fair crop. He would not advise plowing up good old pastures; these might be injured by the plow, but it was a great waste of property to let good farming lands become overrun with weeds and useless plants, for fear of injuring them by cultivation.

A. B. Dickinson insisted that corn could be grown successively upon land without manuring. He spaded up a piece and planted the seed in the same place year after year, using no manure, and by frequent and thorough stirring of the soil he was enabled to produce a crop. This proves that there is great advantage in pulverizing and stirring the soil, and that by proper cultivation, less manures can be used and yet good crops obtained.

Mr. Whitman spoke of a man in the western part of the State who had an hundred acres, one-half of which he had in a crop every year, alternating, the other half remaining fallow. He used no manure except the clover plant, which was turned under. In this way he kept up the fertility of his soil and made money.

Mr. Schull, referred to Mr. Barrington, who had turned under buckwheat for the purpose of manuring, and with the best results. The crop that followed was one of the best he had ever seen.

KILLING OUT THE WIRE WORM.

Judge Owen said he had asked a good many men how to get rid of the wire worm, but never found but one who could give him a specific. He spoke of a four acre lot upon which it was impossible to get a crop, as the worms destroyed it year after year. Some advised one thing and some another, but it amounted to nothing until the following suggestion was acted upon: Let the land go fallow one year, plowing it three or four times during the season, so that not a green thing is permitted to grow. The worm does not like this kind of diet, and it is starved out giving you no further trouble.

KILLING WILD PARSNIPS.

Members at this point of the discussion gradually slid off from fertilizers upon worms and bugs, and the talk for some time was about the potato bug, the curculio, the thistle worm, the parsnip

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worm, and other insects, and the best manner of getting rid of them. Nothing new on this subject was elicited. One member said the wild parsnip was a bad weed to kill out when it once got possession of the soil. He found no means so effective as pulling them up by hand. Another member thought they could be killed by mowing annually before the seed was ripe. This plan had been tried by a member for six years, and yet the weed grew as vigorously as ever.

Judge Owen said he found the best way to get them out of the ground was either to pull by hand or cut off the crown with a sharp chisel. Pushing the chisel down so as to cut the root off about two inches below the surface killed the plant as effectually as pulling it up.

Mr: Whitman advised pulling; and this also was the best means of destroying the cicuta. The cicuta, though a poisonous plant, did not affect the hands when the leaves were wet, like the parsnip. It could be pulled at all times with impunity.

FRIDAY, *September*.

ROAD MAKING, ITS IMPORTANCE TO FARMERS.

The subject of road making was discussed at some length by Mr. Whitman, of Little Falls. Road making concerns the farmers of the country. They, for the most part, travel over bad roads. They do not count the cost of horse flesh, of wear and tear upon wagons and harness, of time wasted in getting produce to market, much of which could be saved by having good roads. There is, in general, a lack of knowledge as to what should be done to make a good road. If the assessed labor was intelligently applied, and the time properly worked, we should have better roads all over the country. To bring about a reformation in road making, to suggest some of the principles by which a good road may be built, was the burthen of Mr. W.'s efforts before the Club.

In the first place, he thought the law at fault. Many years ago, when the country was new and money scarce, it was well enough that the highway tax should be made payable in labor; but now, when money is comparatively plenty and labor more difficult to obtain, a change in the law would be desirable. The highway tax should be paid in money, and a road surveyor appointed to keep the roads in repair. He cited the recommendation made to the Legislature from the Commissioners of the Code, and thought if the Legislature had acted upon it, we should to-day have had a

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road system perfected by which highway labor would have been intelligently applied, and, as a consequence, the roads in the country improved. Instead of this, under our present system, a large share of the labor assessed is not performed, and much of that which is performed is misapplied; and again, large expense is often required to repair damages, which a little foresight might have prevented at trifling cost. The commissioners, in their recommendation, say:

"No good and sufficient reason occurs to us why the highway tax should not be collected in the same manner as other taxes. It is believed that the true method of imparting vitality to this branch of the law, and vigor to the system is to provide:

"1st. Greater concentration of authority in the superior and more perfect responsibility in the inferior officer.

"2d. More duties and larger pay, so that the office may be desirable to competent persons.

"3d. An inducement to pay the rate in money.

"4th. Collection of the rate by the same process as other taxes.

"5th. Constant supervision of the roads during the season of repairing them.

"6th. An annual return to the Legislature of all the statutes of the highway system.

"7th. Ample penalties for any neglect of official duties.

"8th. Liability of the towns for all damages that shall occur by reason of the defective condition of the highways."

He believed that a system on the above plan would secure the best condition of the roads, and thought the law ought also to provide that each town, at its town meeting, should elect by vote whether the tax should be paid in money or in labor.

Judge Owen remarked that in incorporated villages the system suggested was already in force. The tax could be either paid in money or labor, but the money rate was so much below the value of labor assessed that every one preferred to pay the tax in money. The fund was used in keeping the streets in repair under an experienced and practical road master, and a certain length of road outside the corporation was also worked with this fund. In practice it was found that a little money under this plan would go further in keeping up good roads than a great deal of labor assessed and expended in the usual way in the country. He believed that fifty cents, if paid in money, would be better than a day's labor as usually worked when the tax is paid in labor.

Mr. Whitman then went on to explain what was needed in the

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rural districts—a road cheaply made and answering the purpose to smoothness and durability. On roads between points of much travel more expense must be incurred. Such as the McAdam, the Telford, or a road with track-way of stone.

MANNER OF BUILDING THE M'ADAM ROAD.

The McAdam road is made by having the road-bed crowning, and then covered with stone, broken by the side of the road-bed, so that none shall be larger than two and a half inches the longest way. These should be evenly strewed over the road without any admixture of earth or gravel, either among the stone or on the surface. In no case should stone be broken on the track, when it is designed they should remain; neither should they be dumped out of a cart or wheelbarrow, or thrown down by the shovelful in a place, because when the stones are broken on the track all the small chips work their way to the bottom of the road, leaving the largest ones on the surface, where they will not become compact. The same difficulty arises in the case of dumping them in a pile. As soon as they are disturbed for the purpose of leveling them, the small chips work down and the coarse are left on the surface, and the result is the same. He recommended shoveling, so as to have the shovel pass under the pile of broken stone, and raising a shovelful, the fine and coarse will be raised together. Then, by strewing them over the road till the desired thickness is obtained, the fragments will be so intermixed that they will combine to form a compact surface by means of the carriages passing over them.

THE TELFORD ROAD.

The difference between the McAdam and the Telford roads was given. The Telford road is made a level cross section. The bed is paved with stone, the largest being placed in the centre of the track and the smallest near the edges, so that the surface of the pavement is crowning. After this pavement is placed, the chinks are filled with stone chips, placed by hand and made firm with a small hammer. On this the coating of broken stone is strewed, in the same manner as the McAdam road, to the depth of six inches. When this is well packed a coating of a few inches of good gravel free from clay and earth is given. He thought the reason why the so-called gravel roads frequently fail, is that earth and clay is mingled with the gravel. It soon becomes no better than mud, and in this way a large share of the highway tax is

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uselessly expended. When gravel is used it should be a pure article, free from dirt.

In some locations a cheap and durable road can be built by digging two ditches about six feet apart lengthwise of the road, directly under the line of the wheel track. In these ditches lay draining tile of suitable size; protect the tile so they will not be broken. Then fill the drain with stone (the largest being placed at the bottom) to within six inches of the surface and cover with a coating of broken stone.

This would, by having proper outlets, secure the road in a good degree from wet and frost—the great antagonists of good roads. The ditch should be in the shape of a V, narrow at the bottom and good width at the surface, so as to give sufficient width for the wheel track.

By a careful experiment, made in the summer of 1854, it was ascertained that to quarry out and break a good quality of sandstone lying within wheeling distance of the track and to give a coating ten inches deep and eight feet wide, costs less than to lay the same with plank and sills when lumber is delivered at six dollars per thousand feet.

The greatest improvement that can be made on our common roads at the least expense, is to keep the loose stone from obstructing the travel on them. This should be the first, the last and intermediate duty of him who has the charge of the highway. Another important duty that requires careful attention, is to keep the sluices and ditches open, and in condition, so as to prevent the water from taking its course in the middle of the road, and thus doing much damage that a very little cost and labor might have prevented.

The misapplication of labor in making roads over hills and driving over them afterwards, when they might have been avoided, even by increasing the distance, cannot be estimated. Grades ought not to exceed four degrees, or seven feet to the hundred. A road on seven degrees is a heavy hill, and there are roads that have a grade of ten degrees, or seventeen and one-half feet to the hundred. In laying out roads, or making them over around hills and slopes, they cannot be determined with any certainty by the eye alone; an instrument is necessary to assist the most practiced eye. Guessing at grades has been the cause, to a great extent, of so many roads on grades too steep for comfort or utility. Probably no outlay by the inhabitants of a town pays better than the judi-

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cious expenditure for good roads. The owner of real estate finds this in the advancement of his property in value. The merchant and grocer in the increase of his busines; and so with the manufacturer, and more than all, the consumer, in the better supply of the market.

Our reason for poor roads in the country is the general practice of throwing muck or soil into the roads. By observing these three points a tolerable road, on which there is but little travel, may be maintained, viz: Keeping the track free from stone, the sluices open, and the mud out of the roadway.

APPLICATION OF LIQUID MANURES.

Judge Owen said that in his remarks made at a former meeting, in regard to liquid manuring, there probably might have been some misunderstanding. He wished it to be distinctly understood that so far as he had experimented, the best results had been obtained from the use of decomposed or well-rotted manure.

In the growing of water melons, a report of which had been recently made, the manure was taken from the center of a heap that had been long accumulating, and was in a black mass, perfectly decomposed. A portion of this was taken and steeped in water, and the liquid applied. The liquid from fresh manure he did not consider of much account in its application to plants. Had experimented with liquid manure direct from the stables, and it had killed the plants. Some years ago he made an application of liquid guano upon beans and other plants in his garden without any appreciable benefit.

TIMBER GROWING UPON PRAIRIES.

He referred to a statement having been recently made in the *Tribune*, that if fires were kept out of prairies at the West, the timber would spring up spontaneously, and the land be soon covered with wood. That was a mistake. The prairies did not grow timber unless planted, but the openings or ridges where the soil was gravely was natural to timber. Some kinds of trees, if planted on the prairies, will not thrive, and among them is the beech. He ventured to say there was not a beech tree growing on the prairies in all the West. In taking up some pine trees in this section, and shipping them West, a few beech trees were included in the lot. He planted them upon the prairie, but they died out. The prairie soil appears to be poisonous to some classes of trees.

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INDIAN MEAL FOR BUTTER MAKING.

The judge said he found no ground feed so good for butter making as Indian meal; he had made a number of experiments in feeding, and the best results were obtained by feeding it dry. In this state the animal took it slow, moistening it with saliva, and thoroughly masticating it. In feeding it wet, he thought it passed directly to the third stomach, and hence was not properly assimilated. Had a large cow, of the Holderness breed, upon which he experimented to see how much meal could be fed with profit. Found that feeding two quarts at a feed, and twice a day, was all she would bear. This, in addition to hay, brought down the milk in large quantities. By such feed, this cow yielded fourteen pounds of butter per week. Her highest product was forty-one pounds of butter in fifteen days, besides thirty quarts of milk, which was saved out for family use. Did not regard turnips as of much value for milch cows; preferred potatoes, as far more valuable to feed.

FRIDAY, *November* 8.

DRAINING.

Chas. Van Valkenburgh lives upon the Mohawk flats. He is a dairyman and gardener. He thought the subject of great importance, especially to those living upon the flats, who had more or less draining to do every year. It was well understood that we can not raise good crops upon wet land, and most farmers have land that requires draining, but they do not all do it.

There was a difference of opinion among those living on the flats whether it was better to have open ditches or under drains on this character of land. He believed it was best to have open ditches where there was not much fall and considerable water. But many do not get the ditches deep enough. He has ditches from two to four feet deep. The latter are much the best and the cheapest in the long run. If two open ditches be made on the same soil, the one four feet wide at top, one foot wide at bottom, and four feet deep; the other two feet wide at top, one foot wide at bottom and two feet deep, we shall find (if a separate account for each be kept of the expense of repairs, etc., during ten years), that the deeper ditch is the cheapest. Besides the land will be better drained. His main drains upon the flats are open ditches, but for branch drains where there is not much water he would prefer them covered.

Another vital question to those who have lands to drain, is the

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material to be used. Some use stone, some tile, and others like wooden drains. Where the stone is suitable and convenient and it is an object to get them off the land, he would use them for draining, though the expense, he thought, would be full as much as in using tile.

He had two hundred rods of drains to make on the flats, where the soil is of muck, two feet deep, resting upon clay, and had been thinking of laying down lumber instead of tile. His experience in using wood for drains was very limited. Last spring he laid about twenty rods, and it works well. It was laid in the same place where tile had been used a few years ago, and failed in one season. The tile was taken up and the ditches left open until last spring, when they were laid with hemlock lumber, and covered. The manner of putting down the wooden drains is as follows: A board is placed on the bottom of the ditches; then on each side he laid two by three scantling, four inches apart; this was covered with a board, making an opening for the water three by four inches. If the bottom is clay or gravel, he thought it unnecessary to lay a board on the bottom. He would use the two by three scantling edgewise, resting on the bottom of the ditch, and cover with a one and one-half inch plank or slab.

The lumber may be of any length, but in laying it, care should be taken to break joints. For every foot in length it takes two feet of lumber, which at fifteen dollars per thousand, makes three cents per foot, or forty-nine and one-half cents per rod, but if slabs are used for covering, the expense will be less. Horse-shoe tile having three and one-half inches rise, would give about the same opening for the water as the wooden drains. Tile of this description could be had at the Albany depot at twenty dollars per thousand, and will cost delivered at Little Falls, twenty-five dollars. They are thirteen inches long, but as there are more or less broken ones, sixteen are allowed for a rod, which at the rate of twenty-five dollars per thousand, would make the cost thirty-six cents per rod, or thirteen and one-half cents less than the wooden drains, if laid without a board at the bottom. If a board was used, the expense is about the same.

Hon. Harris Lewis, of Schuyler, said horse-shoe tile were unreliable, unless a board was used at the bottom of the ditch. He would prefer sole or pipe tile.

Hon. Wm. I. Skinner, of Little Falls, would not use horse-shoe tile. They crumble and get broken from the pressure upon them.

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Draining is expensive, and it pays to have the work done in the best manner, using good materials. He prefers three inch sole tile.

Mr. A. G. Ford has had good success in laying horse-shoe tile. His land was underlaid with Utica slate. The horse-shoe tile carried off the water more readily than sole tile, and the expense was so much less that he believed it preferable to use them on that character of soil. Doubtless more tile were liable to be broken in handling, but making allowance for that, the difference in expense, even then, was an important item.

Mr. Whitman referred to a recent conversation with Harry Burrell, of Little Falls, who had drained extensively upon his farms in Salisbury. He said Mr. Burrell had abandoned the use of tile and preferred wooden drains. He uses two boards, nailing them together in the form of a V. A board is placed on the bottom of the ditch upon which is laid the edges of the trough like an inverted A. Stone is then put about the sides and filled in on the top, up to a point that may not be reached by the plow, after covering with earth.

Mr. Lewis said there was no trouble about wooden drains lasting a very long time in clay soil. If made of hemlock, the lumber should be used green, or while the sap is in it.

Mr. Whitman said he had been using stone, and he thought when stone was suitable it could be used to great advantage. He took flat stone, placing them upright on one side of the ditch, then another row of stone slanting from the first and extending to the corner of the ditch on the opposite side. Round, or cobble-stone, is filled in upon these. It made a good drain. Some of the members remarked that but few farms were provided with suitable stones for laying drains in this way.

Mr. Lewis had laid his drains with cobble-stone, placing a row on each side at the bottom of the ditch, and another row on top of these as a covering. Then fill in with cobble-stone a foot or more, and filling up with earth.

Mr. Skinner said some might think that he was over cautious in building his drains, but he made sure when a piece of work was finished, that it would stand without further trouble. He did not wish to frighten anybody with the expense, but some of his drains cost three dollars per rod. The ditches were dug three feet deep, and a board was laid on the bottom to receive the sole tile, Then stones were laid on the side above the tile and those capped with a flat stone. Small stones were then filled to within a foot

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of the surface and covered with earth. In this way he gets a double drain, and no difficulty had occurred with those so put down. If he was going to build a board drain he should put the tile inside, and then when the wood went to decay the tile would remain. He wanted to feel at ease when a piece of work was done that it was not to be overhauled at some future time. In regard to draining with stone, the Alexander boys, near Fairfield, preferred them to tile, and they had drained largely.

Mr. Willard referred to a conversation had with John Johnson, of Geneva, who said he would not use stone in draining even if they were convenient on the land. It was better to use tile. There was less danger of the drains filling up, or becoming obstructed, while the expense for digging the ditch was so much less as to make the tile altogether the cheapest.

Mr. Ford said he found this to be so in his own experience. Digging wide ditches in tenacious soil was expensive and slow work. With the proper tools, a narrow ditch for tile could be pushed forward rapidly and at little cost comparatively.

Mr. Lewis had drained one and a quarter acres at an expense of one hundred and sixty dollars. The soil was a stiff clay, very wet. Before draining, he could never get any kind of a crop from it. The drains were sunk four feet deep and twent-five feet apart, and laid with tile. After draining, it produced large crops, and was now set to a peach orchard.

Mr. Whitman said there was no doubt but that it paid to drain lands, even if the cost figured up largely. Many people do not take into consideration how much they are losing annually in trying to get a crop from wettish land, nor the delay in spring in working and getting in crops on account of the condition of the soil. If the losses of this kind for a few years were figured up, it would pay all the expense of draining. He had lost a crop of corn this year, simply because the land was not in condition to work until late in the season. Had it been properly drained, he could have put the corn in, in time to have a good crop.

Mr. Lewis said he could not recommend open drains, they were too expensive.

Mr. Van Valkenburgh thought the great trouble with the expense in keeping open drains in order, was because they were dug too shallow. He would dig four feet deep, getting down into the clay at least two feet. This would hold the earth, and there would be no danger of its falling in.

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Mr. Whitman said the subsoil on a portion of his farm was a clay of so tenacious a character that he had thought of digging a ditch into it, and leaving a shoulder on each, throwing across a stone, and thus forming the drain. He believed he could leave an opening of a foot square, and the drain would stand and prove efficient.

PROSPECTING FOR WATER WITH THE CROTCHED STICK.

Mr. Whitman referred to some of the exploits of Mr. Baker and Mr. John Strow, of Manheim, in finding water by the use of a crotched stick. Had seen articles in the *Tribune* and *Country Gentleman*, where such power or art was pronounced a humbug. He had taken the man Baker upon his farm, and he had pointed out springs and traced veins of water which could not have been known to him from any information. He (Whitman) had set stakes and taken the angle and distance from certain objects to locate some of Baker's springs. Some time after that, had employed Loucks to go over the farm. Loucks followed the same veins and pointed out the same springs that Baker had. He did not believe it possible for any two persons to go over the ground and point out the exact spots in this way without having some power to locate water. Finally, he had dug a well in the place pointed out by these men and obtained permanent water.

Mr. Skinner referred to the Klock well, recently opened at Little Falls, where a great flow of water was obtained by drilling in the rock under the direction of Mr. Strow.

A number of remarkable cases were mentioned where water had been discovered in this way.

Mr. Barse said he had just been digging a spring under the direction of a person who had located it with the crotched stick. He dug about eight feet, and got a great flow of water, and was proposing to carry it to his barns in iron pipe.

Mr. Skinner said that iron pipe did not work well. It corroded and filled up. He had been obliged to take it up in several instances, and he now was using wood. Mr. S. presented to the Club a letter from C. K. Taynter, of West Eaton, Madison county, offering to send medicine that would prove a specific for abortive cows. Any five cows from a herd that had been troubled with the disease could be selected and the trial made upon them, the medicine being furnished by Mr. T., free of expense.

The subject of farm accounts was selected for the next discussion; also best grasses for soiling.

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Mr. Lewis spoke in high terms of the Buffalo grass of the West, and said he believed it to be the most valuable of any species he had seen. He would present samples at the next meeting of the Club, and explain its habits, &c. As he and Mr. Countryman had had something of a controversy about the value of quack and the daisy, he hoped Mr. C. would be present at the meeting.

Mr. Lewis was prepared to show some new facts which might be rather startling to Mr. Countryman. He would present specimens of the potato bug of the West. They were preserved in alcohol, a fluid which had the power of "flopping big bugs" and little bugs, and other creatures besides potato bugs.

FRIDAY, *November* 22, 1867.

LABOR SAVING IMPLEMENTS.

At the opening of the meeting, Mr. S. G. Cook presented a model of Randall's sulky attachment for harrows, and explained its merits. Subsequently the patentee, Mr. Randall, of Adams, Jefferson county, appeared, showing a further improvement of this machine, upon which a patent has been applied for.

The improvement consists in a seed box attached to the axletree of the sulky, and connected with gearing to one wheel, by which all kinds of grain can be sown, broadcast or drilled. It can be used also for planting corn. The machine, when these attachments shall be perfected, will be one of the cheapest and most efficient of any machines of similar character that has yet been invented. We gave a notice of Mr. Randall's sulky attachment for harrows, when on exhibition at the recent implement trial at this city. It was pronounced there, by competent judges, to be a capital invention, but the late improvements make it still more valuable and perfect. In these days of labor-saving appliances, we do not see how farmers who raise grain, even in small quantities, can well do without Mr. Randall's machine, Members of the Club were well pleased with it, and a committee, consisting of Hon. J. Schull, of Mohawk, C. Van Valkenburgh, of Manheim, and J. H. Weber, of Herkimer, was appointed to make trial of the machine on grounds near Herkimer, so soon as the weather will admit in the spring. Ford & Howe's excelsior cultivator, manufactured at Oneonta, Otsego county, will be placed on trial at the same time. Members of the Club believed both of these machines to be very valuable, but as the Club has been careful not to give its full indorsement to articles unless fully tested in the presence of members, or under

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charge of a competent committee, the course above indicated was adopted. Both Mr. Randall and the Messrs. Ford & Howe may esteem it a high compliment paid to their machines in thus securing a public trial of their machines under the auspices of the Club.

Mr. Whitman remarked while the merits of Mr. Randall's sulky harrow was under consideration, that he looked with especial favor upon any device that was practical for saving human muscle upon the farm. The mower, the hay tedder, the horse rake, were so constructed that the operator could ride, and the hard labor shifted upon horses. He was glad to see a device for saving human muscle in harrowing or preparing the ground for crops. There was enough hard work to be done upon the farm, even with all the labor-saving appliances that could be invented. The farmer, in justice to himself and his family, ought to avoid wearing himself out in those labors which could be economically done with machines driven by horse power. A few dollars would replace a worn out team, but no amount of money could repair the human constitution broken down with hard work.

Mr. Randall said he was prepared to show, in an actual test of his machine, that it was easier for the horses than harrowing in the ordinary way. The dynamometer test showed that the sulky, holding a common sized man, only added to the draft thirty pounds, but the great advantage gained was in having the team under perfect control and ease in carrying a steady rein. In the ordinary way of harrowing, the team was obliged to use considerable power in dragging along the driver with the reins. This mode of harrowing on the old plan was hard work, not only for the man, but for the horses also.

Some of the members spoke of the great improvement which the wire-tooth horse-rake, upon wheels and with a seat for the operator, had over the old revolving rake. In the matter of gathering up the scatterings of the hay field, the old revolver collected so much dirt with the hay that it was of little value. The wire-toothed rake kept the hay loose and free of dirt, and when put in a grain field it was surprising what a large amount of grain could be saved by its use. A Mr. Shoemaker was referred to who had used the wire-toothed rake with great success in raking buckwheat, having raked up in bunches, fit for binding, seven acres of buckwheat in half a day.

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FARM ACCOUNTS,

The question for discussion, now being in order, Mr. Willard said he had a very suggestive and instructive article from Prof. Walworth, Principal of the Business College, Utica, touching the question. A brief note, accompanying the article, stated that it had been prepared by the author with the haste made necessary by school duties at this time of year. He then read the paper as follows, which, on motion of Judge Earl, of Herkimer, the Club requested should be published with the proceedings:

"*Book-keeping.*—Book-keeping is the faithful and systematic record of business transactions. A business transaction consists in the exchange of one kind of value for another. By 'value' is here meant everything that man can own, whether consisting of tangible property or rights in action. The object of business is gain; the means, labor and capital.

"There are two regular systems of book-keeping in use; one called single entry, and the other double entry. The origin of single entry is contemporary with the first use of the art of writing, but double entry is more modern, having been discovered in Italy in the fifteenth century. The science of book-keeping remains the same, but its application is constantly varied to accommodate the wants of different business establishments.

"The difference between single and double entry book-keeping consists mainly in the kinds of accounts employed, instead of in the form of the entry, as most descriptions erroneously state.

"In double entry bool-keeping there is a full representation of every instance in which any kind of value has been received or disposed of. This makes a complete record of every transaction, which is sooner or later collected under the name of each kind of value called accounts.

"There are five kinds of accounts in double entry book-keeping. The most extensive establishment in the world cannot require more. These are (1st) cash, (2d) personal accounts, (3d) bills [securities] receivable and payable, (4th) merchandise, real estate and other speculative property, (5th) interest, expense, &c. These five are divided into two general classes. The first class, embracing the first three kinds, is a record of property and debts. The second class, embracing the last two kinds, is a record of losses and gains. These are the 'four financial facts,' of which every set of books should give a true record. The second class sustains to the first

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the relation of cause and effect, which may always be completely proven by the concurrence of exactly similar amounts in figures.

"In single entry there are just three kinds of accounts, viz: 1st, cash; 2d, personal accounts; and 3d, bills (securities) receivable and payable, embracing precisely the first class above mentioned, with the qualities, property and debts.

"As we have seen, book-keeping being a record of value acquired and value disposed of, it is necessary to provide separate places for the amounts of each kind, therefore perpendicular ruled columns for dollars and cents are prepared on each page of all books for this purpose. Those at the left hand, called Dr., are to contain the amounts of the value acquired; and the similar two columns at the right hand, called Cr., the value disposed of.

"The simplest and most important of accounts is cash, and the simplest kind of book-keeping is where this is the only account kept. For keeping this account, a separate book or a special portion of a book should be used, and the account balanced at the close of every day by a comparison with the amount actually on hand. Every person should keep his private cash account on a pocket diary or memorandum book and balance it daily. Young persons should be trained into this practice as early as possible.

"The second kind of book-keeping, as found in actual use, is that of keeping a cash book and also a day book. The latter is used to make persons Dr. when they have any value of us on book account, 'on trust,' or 'on credit,' and to Cr. persons when we obtain any value from them on the same terms. When an account is paid, or otherwise settled, it is marked so across margin opposite each entry. This book may be kept in the order of dates or in the order of headings.

"The third kind of book-keeping found in actual business is complete single entry. The books used are cash book, day book, bill book and ledger, and perhaps some simple auxiliaries. The cash account is kept exclusively in the cash book; personal accounts are first entered in the day book, and afterward transferred to the ledger; and bills receivable and payable are entered in the bill book where they are conveniently classified.

"It will be seen that single entry, as it is only a record of property and debts, does not afford any information as to the sources of losses and gains. These facts can be ascertained by single entry *only in the aggregate*, by comparing present capital with original investment. It follows, therefore, that if a farmer

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wishes to know the gain or loss upon a particular experiment or branch of his business, it is necessary to infringe upon the province of double entry by opening a special account, the difference of which will show the loss or gain; or else keep a separate book for this purpose.

"At the time of opening a set of books, or at the end of the year, and at all times when a change is to be made in the proprietorship of a business of any kind, or by any plan of book-keeping, it is necessary to have a clear understanding of the precise kinds and exact amounts of property and debts of the concern. With this complete, it is easy to open or close the books intelligently.

"The simplest manner for a farmer to keep an account of special gains and losses, is to charge (Dr) each experiment or branch of his business with the cost and credit with the proceeds. Then give it an additional credit at the end of the year, for purchased materials remaining on hand, and for the enhanced value of any improvements, which are in the nature of an inventory. Then the difference between the two sides, cost and production, of the account, will show the gain or loss. A convenient, and about the most simple arrangement of books for the farmers would be, first, to use one of the large size pocket dairies, having a whole page for each day. On the upper half of each page he could keep his cash account, and on the lower half memoranda of Dr. and Cr. occurring during the day. This book should be carried constantly in the pocket, so that every transaction may be entered (with a pencil) immediately after it occurs. Then in the evening the cash entries may be transferred with pen and ink to a regular cash book, the amount on hand compared with the difference of the account, and the latter balanced. The other entries—involving personal and special loss and gain accounts, should now be transferred to the second book—a journal, which should be kept in the order of headings (the name of each account being employed as a heading, with sufficient space left to enter all its transactions for the year underneath it—usually a page), with Dr. and Cr. columns, like a ledger. A journal is preferable to a ledger for this purpose, because it presents a wider space between the perpendicular rulings, thus giving more room for the description of transactions.

"This book should be closed once a year, or sooner, if there should be an entire change in the proprietorship of the business, the gains and losses ascertained, and the capital account amended to correspond. Before proceeding to do this, however, an inven-

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tory must be taken of all property on hand that fluctuates as value, estimated at present worth, as before mentioned."

Judge Owen, of Herkimer, thought the paper timely and suggestive. He believed it important that farmers pay more attention to the keeping of accounts. Many have no system, and keep nothing but small memoranda. It was a question whether double entry book-keeping was adapted to farmers. They wanted something that was plain and simple, and less complicated than double entry. He did not understand double entry himself. It is a profession, and takes time to perfect oneself in it. Therefore, to the ordinary farmer, he did not believe it would be profitable to attempt it. But single entry was easily comprehended, and would prove sufficient for all ordinary farm accounts and entries. In his remarks, he had referred to farmers generally, as they are found in the country. An educated farmer might prefer double entry, and doubtless, by that method, a very clear insight could at all times be had of one's business; but we want farmers to keep accounts, and some plain system, easily understood, would be most likely to be adopted. He had expressed his opinions freely, without much thought on the question, others might think differently, and he should be glad to have their views.

Judge Earl thought some plain, simple method of keeping accounts would be most practicable. Every farmer should keep what might be called a stock account—that is an inventory of his property. Then he should have a cash book for recording all moneys paid out, and a day-book for entering the usual transactions necessary in his business. He supposed the whole could be comprised under single entry.

Mr. Willard said the great trouble with farmers was they could not always tell where losses were sustained. At the end of the year in summing up the aggregate of receipts and expenditures, there was no difficulty in finding out how much had been gained, but we want to know just where to place this account. We want to know what part of the business pays, and especially that part on which there is a loss. Before the war he had known a good many farmers raising oats for sale, year after year, at thirty-one cents per bushel, and they never suspected that they were farming that crop at a loss.

Mr. Whitman said he had known oats sold at eighteen cents per bushel, and if farmers had kept an accurate account of the cost of

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raising and fitting for market, they would have been convinced there was no profits on oats.

Mr. Lewis put the average value of oats, from 1830 to 1850, below eighteen cents per bushel.

Judge Earl thought it might be well for farmers to keep a regular account with every crop raised on the farm, but it could all be done by single entry.

Judge Loomis, of Little Falls, said the question before the Club is a very important one for the farmer. Next to good tillage and the saving of manures, the keeping of farm accounts is first in order. It calls into action mental instead of physical power. It was a great error with most farmers in not keeping a pencil and memorandum book in the pocket to make entries every day. By doing this, it would make a vast difference in the income, and a vast difference in allaying altercations with neighbors. He would be a benefactor who would get up a good account book and form of memoranda to be carried in the pocket.

PERKINS' FARM ACCOUNTANT.

Mr. Whitman read letters from Fred. Perkins, Esq., of Chester, Massachusetts, who had recently published the Farmer's Accountant, a comprehensive and systematic book for keeping farm accounts. Mr. Perkins had intended to be present at this meeting with a sample of his book, but had misunderstood the hour of meeting, thinking that the Club held evening sessions. From the numerous testimonials in favor of the work, he was impressed with the belief that the work is well adapted to the wants of farms. He read recommendations of the work from Geo. B. Loring, President New England Agricultural Society; from John Johnson, the great farmer of Western New York; from Levi Bartlett, of New Hampshire, widely known for his practical writings on agriculture; from Solon Robinson, of the *Tribune*, and several others.

We may remark here that we have examined Mr. Perkins' farm accountant, and find it admirably adapted to the wants of the practical farmer. In the front part are many useful rules and tables, which will be found convenient in casting up accounts. Then there is a well arranged course marked out with blanks and headings, by which the farmer may keep all his different accounts, the inventory, expense, stock and crop accounts, hired help, field experiments, &c.; and the beauty of the whole is its simplicity and the readiness with which it is understood by the commonest mind. It

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is the best practical farmer's account book that we have seen, and we believe that its general introduction would not only add to the farmer's income, but tend greatly to the elevation of farming as a profession.

A great many farmers would be glad to keep a record of farm experiments, if they knew how the work should be done. The blanks in this book are all arranged in items, requiring only to be filled out, and we are satisfied if farmers could only once be induced to use the book one season, the results would be so satisfactory that they would consider it indispensable in their business thereafter. We speak from some experience in this matter, having long felt the want of a well arranged system, with printed headings, for keeping farm accounts. We advise farmers to avail themselves of Mr. Perkins' book, as one of the best investments they can make to commence the new year It is handsomely got up with good paper and binding, and costs but a trifle more than the common blank book of the same size, while its use in instituting a better system of keeping farm accounts would be invaluable.

Mr. Rust, of Herkimer, spoke of the advantages that had resulted to him in a business way from farmers keeping memoranda. He cited a case where a farmer who kept no memorandum had disputed him and refused to ratify a transaction until he found the facts minuted down by another farmer who had had a similar transaction with him at the same time.

Several other speakers spoke of the advantages that would result to the farming community if memorandum of experiments with crops was made, giving the expenditures and receipts. If this were more common, we should have more facts to guide us instead of the guess work now for the most part depended upon.

THE BUFFALO GRASS.

Hon. Harris Lewis, of Schuyler, presented samples of grass found in Green Lake county, Wisconsin, which was known there under the name of Buffalo grass, and which he believed was the most valuable grass for grazing that he had ever seen. He found it growing over an area of 90,000 square miles. It grows in tufts like orchard grass, and stock eat it greedily. When cut for hay it will give two crops in a season of two tons to the crop. It springs up very early in the season, grows in all soils, and the second crop will grow and mature from the last of June to the 25th of August. The plow is fatal to it, and when the old pastures

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and meadows in which it luxuriated are broken, it is killed entirely. It stands frost well, and is enduring. When designed for hay it should be cut twice. He thought to a dairy region like Herkimer this grass would be as valuable as a gold mine, and a good deal more remunerative than an oil well. The specimens shown measured seven feet in length. He also showed samples of the mustang grass, the habits of which were similar. Both of these he had obtained during his recent journey through the West. He thought both of these grasses were adapted to our soil and climate, as they were found in the same degree of latitude west, and on similar soils.

THE POTATO BUG.

He presented specimens of the potato bug of the West, in its various stages of growth, and gave a brief history of the insect. This bug, he said, was found years ago on the eastern base of the Rocky mountains, feeding upon the wild tomato. But as settlers began to get a foothold near its home, and to cultivate the potato, it found that plant a more congenial food, increasing in vast numbers, and completely destroying whole plantations. The parent bug burrows in the ground, and lies dormant during the winter. In spring it comes out prepared to deposit its eggs on the under side of the potato leaf, at the rate of sixty eggs a minute. In from four to seven days the eggs are hatched—the slugs resembling a small bed-bug. In eighteen days they come to maturity, all the time devouring greedily the plants. The female, as soon as impregnated, goes into the ground, and in about five days emerges and deposits its eggs; so that it takes only about thirty days to bring forward another generation. These bugs are provided with wings and can fly. They travel eastward at the rate of fifty miles a year, and he believed we were doomed to have them here within a period of ten years.

WHEAT GROWING UPON DAIRY FARMS.

Mr. Charles Van Valkenburgh opened the discussion on wheat growing. He said he had not had much experience in wheat growing in connection with dairying, but was willing to give his experience as far as it went. He had often heard it remarked by old people that in early times good crops of wheat were grown in Herkimer county. But after the appearance of the weevil, wheat growing was generally abandoned for the then more profitable branch of farming, the dairy. For many years there was no kind of farming so profitable for Herkimer county farmers as dairying,

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but for the past two years so rapidly has the cheese factory system been developed, that it has had an important influence on the price of cows as well as cheese, and the business was less remunerative. He believed the prospects were that cheese is to rule low, while cows would remain comparatively high. Indeed, so high would cows rule, partly in consequence of cheese factories being built in districts where we have been in the habit of getting supplies of stock, that we cannot afford to purchase them. His rule for purchasing cows before prices became inflated, and when there was no premium on gold, was to make the price bear a certain relation to the price of cheese. Thus, if cheese was worth but six cents per pound, a good cow was worth no more than $30. Cheese at seven cents added $5 to the value of the cow, or, in other words, multiply the price of cheese by five, and call the product dollars, and we have a fair value for a good dairy cow. Now, if cows cannot be purchased by this rule, it is better to let them alone and go to raising our own stock, and also to grow enough wheat for our own consumption at least. He thought we could raise as good wheat now as in former times, and quite as much per acre. At the high prices of flour this year, no grain crop pays better than wheat. In Snell's Bush, near the eastern borders of Herkimer county, wheat has been grown with good success. The largest crop he had heard of this year in the section referred to, was that grown by Mr. J. Kilts, he having raised sixty-seven bushels of wheat from two acres. Mr. Stevens, of Danube, raised ninety-six bushels from three acres and four bushels sowing. These crops show the capacity of our land for wheat, and the profits can be readily estimated. He thought the most profitable way of managing meadows is to break them up once in about eight years. He would break up one-eighth of the meadow land every year. The first year plant to corn, following the second year with oats or barley, then after the crop is off plow and top-dress with well rotted manure, which should be well worked in with the harrow or cultivator. After the ground has been thoroughly prepared, sow with wheat and seed to grass. He would let it lay in grass five years. By following this course good crops of wheat and grass could be obtained, and he thought it the most profitable way of using the manure. Nearly all the big crops of wheat grown in this section had been raised in this way. He recommended the drill for putting in wheat. Last fall he drilled in a field for his neighbor, Mr. Lansing, which, at the commencement of cold weather, looked as well as any fall sowing he had

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ever seen. He did not believe grass seed or grass could be properly put in except with the drill. During the last two years had seeded down fifty acres, using a drill for the purpose, and with good success. It is by far the best seeding he had ever done, and his neighbors say they never saw better. He had used the drill only for a few years, but found it a great improvement over broadcast sowing by hand.

But he thought there was another question of considerable importance in connection with grain raising upon dairy farms. He said his meadow and grain lands lay in two large fields; so that in raising wheat it must be fenced or the after feed of the meadows lost. The expense of fencing in the ordinary way would more than cover all profits on the wheat crop. Many in the dairy region are situated in the same way, but if we had some cheap kind of portable fence that can be easily put up and taken down and moved from place to place, it would be very desirable. Mr. Van Valkenburgh thinks he has constructed such a fence, a model of which he showed us. It is not a patent affair, and we therefore give a description of it for the benefit of those who may desire to avail themselves of the suggestion.

The panels are thirteen feet long, four boards to the panel, each board six inches wide, with slats four inches wide and one and one-half inches thick, nailed at the ends and middle of the panel. It will take thirty-one feet of lumber to the panel, and as three panels set up zig-zag make two rods in a straight line, the lumber for every rod of a straight line is forty-six and one-half feet, which at one and a quarter cents to the foot, would cost fifty-eight cents. If wrought nails are used for nailing the slats, the cost will be five cents per rod. In putting up the fence two iron bands are used about the slats, one at the bottom and one at the top. The bands are made of inch hoop-iron, riveted, and will cost about two cents each. It will take three bands to the rod, so that the whole cost of material for the fence is but sixty-nine cents. After the bands are on the panels, set at the desired angle, which presses the ends of the panels together at the corner, making them firm and substantial. Mr. V. states that one man will set up twenty rods of this fence a day, which at eight cents per rod for putting up, would make the whole cost of the fence, set up, seventy-seven cents per rod, in a straight line.

The Club thought Mr. Van Valkenburgh's suggestions practicable, and we give them, hoping to hear from others on the subject.

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DAIRY FARMS.

The question of "what it costs to make a pound of cheese" in Herkimer county, now begins to be agitated among the farmers of that county. The impression generally prevailing, that one need only to go into dairying to secure a fortune in a few years, is not so apparent to the practical farmer. In the old times, Herkimer county farmers did a fair business in making cheese at seven cents per pound. This fact as a basis has led many astray. They naturally conclude that all above the seven cents which cheese now brings, must be clear profit. The majority of farmers keep no current farm accounts. They cannot tell what a bushel of grain or potatoes costs, or in fact any other farm product. They sell their products at prices which seem to be high, they are much larger than in former years, and conclude that they must be laying up money rapidly. At the end of the year, when all the products have been sold, and all the various accounts and expenses are to be paid, the rugged fact presents itself that there is "no money in the locker," and there is some considerable astonishment where it has gone. The first thought which occurs, is that some useless extravagance has been indulged in, or that some more than usual losses, scattered over the year's doings, have eaten into the profits. On carefully revising the operations of the year, men fail to find the leak. Frugality, freedom from losses of stock, of crops, of bad debts, marks the course of the year, and yet with what seems a good round price for products sold compared with old rates, farming does not begin to pay as in old times.

The past year has brought this whole subject right home to the farmers of Herkimer county, and they are waking up to the fact that a good deal of hard work has been done "for nothing and board thrown in."

In view of this condition of things, the Farmers' Club have been discussing the question recently, as to the "cost of producing a pound of cheese." We were unable to be at the meeting on the second Friday of January, when this question was first introduced for discussion, but hearing that the subject was put over to Friday last, we attended that meeting, at the court house in Herkimer village, for the purpose of getting at the estimates, "What does it cost to produce a pound of cheese in Herkimer county?"

In Herkimer county, noted as one of the best grazing districts in the world, where it is said the grass crop has not failed once for the last forty years.

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Mr. P. B. Myers, of German Flats, said he had formerly rented his farm on the three-fifths rule. That is, the tenant furnished team and utensils, doing all the work, and returning the landlord three-fifths of the cheese, one-half of the butter, one-half of the pork, one-half of the deacon skins and half of the grain and vegetables. If any hay is left over, the landlord pays three dollars per ton for harvesting it. If any hay is to be bought, the tenant pays three dollars per ton, and the balance is paid by the landlord. The landlord pays three dollars for every calf raised up to four weeks old, and then takes charge of it. The tenant pays half the taxes, and is to keep fences and farm in good order.

Mr. M. said he had rented formerly under this system but did not like it. He had recently adopted another rule. The tenant gave him 225 pounds of cheese per cow, guaranteeing the price of cheese the same as the average at the Herkimer factory. He made this matter about price a point, and the tenant could then take his choice of manufacturing at home or sending the milk to the factory. Each party puts on an equal number of hogs to consume the whey, and each has half the pork. The tenant takes all the deacon skins, pays all the taxes, and is to raise, if required, fifteen calves each year, up to four weeks old. for the landlord. The dairy consists of forty-five cows. Mr. Myers makes the following estimates of receipts and expenditures:

RECEIPTS.	
Forty-five cows, averaging 400 lbs. of cheese per cow (18,000 lbs.), which sold at an average of $14.30 per 100 lbs.....	$2,574 00
EXPENSES.	
Labor and taxes.....	$1,126 00
Interest on land at $75 per acre.....	980 00
Interest and depreciation on 45 cows at $60 each, 10 per cent.	270 00
Keeping team.....	150 00
Repairs to buildings and untensils.....	100 00
Incidentals.....	50 00
Total expenses.....	$2,676 00
Total receipts.....	2,574 00
Loss on the business.....	$102 00

Mr. Myers says there are many expenses not enumerated, while the interest and depreciation on stock is much too low. It will be remarked that nothing is allowed in this estimate for manufacturing cheese, boxing, bandage, &c., which usually amounts to two cents per pound.

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Hon. Josiah Schull, of Mohawk, has a farm of eighty-one and one-half acres, which cost $130 per acre. He keeps twenty cows. His estimate is as follows, making no account for the farm:

RECEIPTS.

Twenty cows, yielding 8,337 lbs. of cheese, whole sold for $14.28 per hundred	$1,186 33
Increase on animals for beef	40 00
Calves	45 00
Total receipts	$1,271 32

EXPENSES.

Boy six months and board	$180 00
Man, including board	360 00
Fertilizers—plaster, &c	18 00
Taxes	78 00
Horse-shoeing and other repairs of farm implements	50 00
Wear and tear of implements	65 00
Average repairs of fences and buildings	175 00
Average depreciation and interest on stock	180 00
Insurance	4 00
Incidentals	50 00
Carting milk and manufacturing cheese	215 00
Total expenses	$1.305 00
Total receipts	1,271 33
Loss	$34 33

In this estimate, it will be remarked that nothing is charged for farm, for female labor or for superintendence and work by Mr. Schull and family.

All the grain raised upon the farm is consumed by them and stock. It will be seen that the cheese costs more than $14.25 per hundred. The statement was considered by the Club a very fair estimate.

Mr. Eleazer Rice, of Fairfield, one of the best farmers in Herkimer county, as well as one of the most successful, a sound, clear headed business man, gives the following estimate of profits from a fifty-cow dairy. In this case, as in that of Mr. Schull, the farm is thrown in or called nothing:

RECEIPTS.

Fifty cows, 400 pounds to the cow, 20,000 lbs., at 14 cents	$2,800 00

EXPENSES.

Interest on cows at $70, and utensils, wagons, &c., $5,000, at 7 per cent	$350 00
Depreciation of cows and loss from disease, average	350 00
Depreciation on teams, utensils, &c	250 00

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Fertilizers	$36 00
Taxes on land and personal property	150 00
Horse-shoeing and repairs of tools, &c	50 00
Repairs of buildidgs, fences, &c., average	150 00
Insurance	8 00
Incidentals	50 00
Paid for hired help	500 00
Board, &c., of hired help	250 00
For making cheese at factory, boxing, &c	400 00
Total	$2,544 00
Total receipts	$2,800 00
Total expenses	2,544 00
Profits	$256 00

In this estimate, it will be remembered, nothing is charged for personal or family services. Some small items, doubtless, are sold from the farm to partly balance this labor.

Mr. Schull said that he could present another view of estimating expenses on his farm of 82½ acres, as follows:

Hay—45 tons for wintering 20 cows—at $15 per ton	$675 00
Interest on 20 cows, $70 each, at 7 per cent	105 00
Expenses in keeping team	150 00
Hired man six months	180 00
Man by the year	200 00
Total expenses	$1,310 00
Receipts from the farm, from all sources, as before noted	1,271 00
Loss	$39 00

Mr. Whitman remarked upon the high prices which land would command in Herkimer county, and especially in the vicinity of Little Falls. He spoke of a farm on Fall hill, about three miles from the village, with only ordinary buildings, which had just sold for $140 per acre, and not including stock, which was included in a separate purchase. This farm was sold by Mr. Rosecrants, and perhaps was about a fair average as to soil of lands in the vicinity. He said, with the estimates which had been given, he did not see how men could pay for such farms by dairying it out of the land.

There are many farms within three miles of Little Falls, we may remark, that are held at higher figures than the above, and which would bring more money.

In looking over the preceding statements, it will be observed that the items of labor, board and taxes figure up quite largely. Hired help for the last few years, even for the commonest hands,

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has ranged from $25 to $30 per month and board. Most of the Herkimer county farmers purchase their flour, and considerable quantities of grain fed to stock, these have been high, so that in reality the most ordinary Irish laborer often gets a salary of from $500 to $600 per year. Whether the farmer can continue to pay these rates remains to be seen. Many say they shall not do it. Again, taxation is excessively high, and must continue so for many years. From this there is no escape. But one thing is evident, a more rigid system of economy must needs be practiced, or higher prices for cheese maintained, to make dairy farming the prosperous business it was previous to the war, if the above exhibits are to be relied upon as the basis of profits

March 13, 1868.

RAISING GRAIN IN CONNECTION WITH DAIRYING.

The question before the Club was in regard to the kind of farming which it would be most advisable for Herkimer county farmers to adopt, in prospect of low prices for dairy products. In other words whether the practice of carrying on the dairy exclusive of other branches of farming should still be adhered to, or whether the introduction of grain growing, stock raising and other kinds of farming should not now be added to that of the dairy upon farms.

This question was opened at a previous meeting of the Club, a report of which we have given. It will be proper to remark, however, that Herkimer county farmers, for a number of years past, have paid but little attention to any kind of farming except the dairy. Grain raising, it is true, has not been entirely excluded, but farmers as a general thing have not grown grain as a matter of choice, but because the pastures and meadows fail from time to time and require to be re-seeded. Hence there was necessity for breaking up these patches of land and raising grain, the impression all the time prevailing that there was no profit in the growing of grain, but that it was one of the losses to be endured for the purpose of getting the land back again in good condition to grass. So well established had this impression become that many advocated turning up meadows and seeding heavily to grass without taking off a crop of grain. The great bulk of flour, of coarse grains for stock, of milch cows for the dairy, came from other sections, and of late years even potatoes in considerable quantities were imported into the county to supply the farmer's table. There

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is no doubt but that when the annual product of a cow would sell for $100 to $120, and flour could he bought at six to eight dollars per barrel, with the coarse grains in proportion, there was little inducement to raise grain, and more money could be realized from grass and the dairy.

Of late grains of all kinds have boen excessively high, while cheese has depreciated in price below other articles of food; hence, in the minds of many, a change of farming is thought advisable. It may be well to remark also that the lands of Herkimer are fertile and productive of grain crops, The black slate hills north of the Mohawk are exceedingly rich, upon which very large crops of corn, wheat or barley can be grown, but the soil being heavier and more broken than at the west, is not so well adapted to machinery, and cannot be cultivated so cheaply as less tenacious and more level soils.

Mr. Whitman, who was called upon to open the discussion, referred to the prevailing opinion of Herkimer county farmers on this subject. He spoke of a recent visit to Emory Bartlett, of East Winfield, Herkimer county, who believed, even under the low prices for dairy products, that dairy farming, exclusive of other branches was most profitable. Perhaps Mr. B. was right—upon that farm and with his arrangement. The barn is fifty feet wide by one hundred and twenty feet long, with basement under. The stables are very wide. The cows stand in rows facing each other, with a broad alley between. There is also a wide space back of the cows, with a cement bottom or floor, where the manure is piled in winter, until at such times as it is convenient to haul.

Mr. Whitman thought the cows and young stock upon this farm were as fine a lot as he had ever seen together. Mr. Bartlett does not feed grain, but believes in early cut grass, which keep the cows in good flesh. There is an arrangement at this barn with spouts and troughs before the cows, for feeding whey in summer, and the whey is used by the stock. Mr. Bartlett's idea is to adhere to the old practice, and make the dairy an exclusive business "through thick and thin," believing that in the end this course will prove the most remunerative. Others, said Mr. W., take a different view of matters, and believe Herkimer county had seen its best days, at least for the present. They are selling off their cows, and will try some other branch of farming. Mr. Whitman said his views on the question, were that farmers should raise what they wanted to consume on the farm. It was possible that some crops might not

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pay, but the average of the whole would. He thought a farmer in good circumstances should keep one man to attend to the garden and vegetable department of the farm. Early vegetables should be grown, and the family provided with a variety of good wholesome food of this character. Had noticed that many families, nearly destitute of vegetables, depending on others for a supply, and paying out considerable sums annually which might be saved by proper attention in cultivating these necessary articles for the table. He thought mangolds should be raised for cattle, and carrots for horses, the animals so fed would be healthier, and could be wintered at less cost than on hay alone. As for flour and wheat, he would be glad to know the amount of money that was sent out of the county for the purchase of these. All the wheat and coarse grain needed in the county should be raised here, and the money saved to the county. He believed as good wheat could now be grown in the county as in old times, when the county was noted as a wheat growing section. The old pastures were rich, and would bring large crops if broken up. Then the idea that cows could be bought cheaper than to raise them in the county was all wrong. They could be raised here cheaper, and we should then have healthier and better stock.

A farmer who runs his farm to one thing, is like the man who puts all his eggs in one basket, which are more liable to be broken than when put in several, for in the latter case some would escape.

Mr. Lewis referred to a motto of the late Col. Alexander, that "in business no man should invest all he had in one risk." The same would apply to farming. He thought a great deal of money was paid out annually by Herkimer county farmers for the one article of flour. The amount could be very nearly ascertained by referring to the census, as ten persons on an average would consume nine barrels of flour during the year.

Hon. W. I. Skinner said that upon his farm the average annual consumption of flour was a barrel to each person. He produced the late census of the State, from which an estimate was made, showing that the town of Little Falls alone paid out annually $60,000 for flour.

Mr. Lewis, of Schuyler, said he commenced farming with the idea of what he undertook to do he would do well, and as extensively as possible. He had started with a dairy, and had made it an exclusive business on his farm. But he believed that the time had come when the rule should be varied. He thought farmers

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should raise their own beef, raise their own cows, and produce all the grain needed in the family and upon the farm. He spoke of potato growing as perhaps as profitable as any other branch of farming. Wheat could be raised in Herkimer county for half what farmers have to pay for it. He believed that the cows which we turn off in the fall for barrellers, and at small prices, could be fattened and turned into beef by the farmer at a profit.

Mr. Willard thought some other breed of cattle than the native must be obtained to bring about the best results in this respect. He did not believe a native cow kept until she was old, and after giving milk all summer, could be fattened in the fall and winter at a profit—grain of all kinds was too high. Possibly, if the short-horn or some breed that took on fat rapidly was introduced, and the animal turned off before becoming old and worn out, there might be a profit in making beef, as suggested by Mr. Lewis. There was a question whether cows were not often kept in the dairy that were too old to be profitable. The English say that the milk depreciates in quality as the cows grow old, and hence English dairymen believe it good policy to turn off their cows at such ages that they may be readily fattened and got into beef.

Mr. Brown, of Fairfield, said he was satisfied that heifers did not give as rich milk as older cows, but after nine years of age the milk depreciated in quality.

Mr. Feeter spoke of four cows that he had been feeding for beef during the winter. In the fall he could get but $15 a head for them, and concluded to fatten them, and had just disposed of three out of the lot for $150. He thought it had paid him to feed, &c.

Mr. Whitman made an estimate of the money that was annually sent out of the county for flour and grain, and found it at a very low figure to be at least half a million of dollars. He thought this altogether too large a sum to be lost to the county. Better raise our own wheat and keep the money at home.

Mr. Feeter said spring wheat should be sown very early to get the best results. Had tried the Black sea, the Fife and other varieties.

Mr. Brown preferred the Australian to any variety of Spring wheat he had used.

Judge Loomis believed it would be better for the county to adopt a more general system of mixed husbandry, and a more thorough tillage of the soil than now obtains. He thought the

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farms too large. The time will come when, as lands become dear as in England, we shall farm better than now. We cannot expect good crops without a more liberal application of manures. He spoke of Mr. Skinner's farming, and said that gentleman liked to do things well, referring to the fact that he (Skinner) had recently hauled out six hundred loads of manure upon twenty acres. That was in the way of good farming. He thought Herkimer county farmers were using too much land and too little labor.

At the West they can produce larger crops from a given surface, with less labor than here, because the land is more level, and better adapted to machinery. He thought if farmers here should spend more money on a smaller amount of land, the crops would be larger and the profits more, but it cannot be done by the dairy alone. A mixed system of husbandry must be adopted. The principle of getting the largest returns from cattle is to make them as comfortable as possible. He deprecated the use of the stanchion, and thought cows should have more space, a bedding of straw, and be held by a chain and ring in the stall.

Mr. Stevens, of Danube, said that the dairy had been the most profitable branch of farming in Herkimer county, but it was evident now a mixed husbandry must be resorted to. We must go to raising our own grain, and save that source of expense to our farmers.

Mr. Storms, of Montgomery county, said that the farmers of his section grow grain with good results. Their system is to plow sod and put on corn for the first crop. This is followed with barley, and as soon as the barley is off, the ground is plowed and prepared for winter wheat, seeding down to grass. Good, fair crops were raised in this way, and the land was kept in good heart. In preparing for wheat, manures were carted on after plowing and worked in with a cultivator. Many farmers of this section are trying hops.

Mr. Feeter, of Manheim, said that good results were obtained in his neighborhood by having wheat follow oats. The wheat crops are very large, and no crop has paid better for the past few years.

In referring to the potato crop, Mr. Brown, of Fairfield, spoke of raising 500 bushels of potatoes to the acre. This was some years ago.

Mr. Van Valkenburgh, of Manheim, said he had grown at the rate of 400 bushels of potatoes per acre the past year. The

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varieties were Gleason's and early Goodrich. He believed better profits would be realized by our farmers by going more into mixed husbandry, raising our own stock and grain and everything needed on the farm in the way of grain and vegetables.

Judge Loomis said he found, on looking over the census, a remarkable discrepancy in the amount of stock, other than milch cows, kept in Herkimer and Montgomery counties, as compared with other counties of the State. The number of horses and young stock was very small, comparatively. The working oxen in Herkimer county numbered only 318.

In order to get a sense of the meeting on the subject, the following resolution was offered by Hon. W. I. Skinner:

Resolved, That mixed farming, in connection with the dairy as a leading business, is the best for Herkimer county farmers.

Carried unanimously.

The following officers for the ensuing year were elected: President, Hon. Harris Lewis, of Schuyler; Vice-President, S. S. Whitman, Little Falls; Secretary, X. A. Willard, Little Falls; Treasurer, Hon. Josiah Schull, Ilion; Librarian, W. R. Stevens, Danube; Directors for three years, Hon. Robert Earl, Herkimer, and Peter Countryman, Herkimer.

FRIDAY, *March* 27, 1868.

FERTILIZERS.

Mr. Robbins, of Gorham, Maine, was expected to open the discussion, but as that gentleman was not present, Mr. Hollingworth, of Utica, was called upon to speak upon the qualities and effects of some of the various fertilizers of which he had samples present. He commenced by stating that the call was unexpected on his part, and that he was not really prepared to give the analysis of the superphosphates of which he had samples, as the papers giving this information had been left at home.

He had several samples of ground bones, and he supposed all present were aware of the value of this character of fertilizers. His samples indicated the condition in which that article was prepared, so as to be used most effectively upon the soil. In regard to the samples of phosphates, he would refer to Croasdale's superphosphate, the principal ingredients of which were Nevessa, Peruvian and fish guanos, sulphuric acid, salt, &c. A good article, rich in phosphates and containing ammonia. There was prejudice against superphosphates because some manufacturers had thrown upon the market a poor article. He believed a pure article was

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one of the best and cheapest fertilizers. Guano could not safely be applied directly to plants; it was too strong and burned them up. It should be mingled with other substances to reduce its strength. The superphosphates, however, were well adapted to plant life, and could be applied without danger.

In regard to the result of applying bones to land, he would give the record of his own and his brother's farm near Utica. The farm is known as the old Devereux farm, and when they went upon it, fifteen years ago, was regarded as a barren, worthless tract of land, covered with briars, wet and swampy, upon which scarcely any useful plant could be raised except in very limited quantities. The first thing done was to underdrain the land. This had been pretty thoroughly performed, the drains being laid with stone. The main drain was four and one-half feet deep. The drains lead into this were more shallow, from two and one-half to three feet deep. We commenced first upon a sixteen acre lot. The draining having been perfected, the land was plowed in the fall and laid until the next fall. We then drew upon the land the refuse from 8,000 head of cattle. This consisted of the waste from the kettles after boiling the feet and other refuse parts of cattle to extract the grease, &c., for soap manufacture.

Some parts of the land, especially a five-acre piece, was covered over with this refuse to the depth of five inches. It lay in this condition all the winter, and the next spring was plowed and harrowed, and in the following fall sowed to winter rye. The neighbors predicted that the crop would be a failure, as the land, they thought, was too rich. The winter succeeding was unfavorable for winter grain, as there was little snow. In the spring scarcely a blade of rye could be seen on the ground, but as the season progressed, it began to show itself, and the result was one of the finest crops of rye that we had ever seen. The straw grew seven feet two inches high, and the reaping had to be done with a sickle. The grain was thresned and measured, the average being at the rate of fifty-two bushels to the acre, and the weight sixty-two pounds to the bushel. The ground had been seeded to grass at the same time the rye was sown, but the grass did not seem to do much until after the grain was harvested; then it shot up luxuriantly, and we had a good crop that fall. Since that time we have had very heavy crops of grass upon this field every year, and with no additional manuring. The grass is timothy mostly, and it is so heavy that we have to cut early in the season. We estimate the yield is at the

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rate of three and a half tons to the acre at first cutting, and we take two crops per year, the second crop also yielding largely.

The land seems to be just as productive now as at the first crop, although it has been down in grass seven years. Our farm consists of seventy-one acres, and we have used no manures except bones and the refuse from the soap kettles. In the spring, after manures are put upon the land, we usually go over with a harrow and work it in, and then follow with a roller.

We have sixty acres in grass, and we sold of last year's crop one hundred tons, besides keeping on the place five head of cattle and six horses, and we shall have fifteen tons left. We estimate we shall cut next year at least one hundred and eighty tons if we have an ordinary season for grass. We have applied ground bones at the rate of seventy bushels to the acre. On the sixteen-acre lot, after taking out garden and the place where the buildings stand, there is fourteen and a half acres left. On these fourteen and a half acres we took particular pains last year to weigh the crop of hay. It amounted to thirty-nine and a half tons. We commenced to cut the grass on the 21st of June. This was the result of the first cutting. From two and a half acres we took a second crop and had four large loads of hay. The balance of the field was not cut, and this spring we shall set fire to the old grass and burn over the field. Don't know as it is good policy to burn over meadows in this way, but from observing the good effects resulting from the Jersey meadows, treated in a similar manner, have adopted the plan. Again, as the after-swarth does not rot, it would be in the way of the next crop of grass, impeding mowing, and for this reason we desire to get rid of it.

The following is the estimate of cash receipts from this sixty acres of meadow last year:

Six tons at $22 per ton	$132 00
Fifty tons at $14	700 00
Twenty-nine tons at $15	435 00
Fifteen tons at $20	300 00
Total	$1,567 00

To this should be added the hay consumed by five head of cattle and the six horses, which are kept up summer and winter, say in all 34 tons more, which at $15 per ton would make the grand total receipts from the 60 acres $2,077.

Hon. Harris Lewis said he was well acquainted with this farm

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before the Hollingworth Brothers went upon it, and it was regarded as a worthless piece of land.

SOWING GRASS SEED.

The President stated that the subject under discussion would be dropped for the momen tin order to give Mr. Cephas Johnson an opportunity to state his method of sowing grass seed, as some present might wish to adopt it. Mr. Johnson said he had usually made a practice of seeding down to grass; with the oat crop, however, any other grain could be used. The ground is put in good condition; then the grain desired to be used is wet up lightly by stirring it up with water, and draining, so as only the surface of the grain shall be moistened. Then to every three bushels of oats turn on twelve quarts of timothy seed and one and one-half pounds of clover, and mix thoroughly with the grain. The grass seed will adhere to the kernels of grain, and both can be sown broadcast at one operation. The grass seed is spread very evenly by this method, and was very sure to take. Mr. Johnson thought the grass seed being in contact with the grain received considerable nutriment from its decay, and for this reason was sure to take and do well. He remarked that when the land was manured in the spring, previous to seeding, he omitted the clover, as his soil was natural to clover, the clover coming in too thickly if seed and manure are used at the same time.

Mr. Willard said he had tried the method recommended by Mr. Johnson, and found it to succeed well.

Mr. L. B. Arnold, of Tompkins county, formerly of Herkimer county, and an old member of the Club, being present, said in answer to a question in regard to the depth of covering grass seed, and how it vegetates, that it depended much on the character of the soil. He had noticed this particularly from the dissimilarity of the soils where he now resided, as compared with his old farm in Herkimer. The soil of Tompkins is gravelly, and grass seed can be covered deeper than upon the Utica slates, of which Herkimer soils are largely composed. On the latter soil, where the seed was covered two inches, it was invariably killed out or did not vegetate.

To a question concerning the best way of sowing red top, Mr. Lewis said he always sowed it separately and by hand; he would not mix it with other grass seeds at the time of sowing.

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A NEW CHEESE HOOP.

The President said, as we have already digressed from the topic under discussion, he had the pleasure of introducing Mr. E. Ellis, of Whitesboro, Oneida county, N. Y., a gentleman well known to the dairy public as the manufacturer of the celebrated Whitestown pail, who had a new cheese hoop to show the Club.

Mr. Ellis said there was great complaint among dairymen in regard to removing the cheese from ordinary hoops, and Mr. Purdy, who had been with him for some time manufacturing the common wooden hoops, had turned his attention to the subject in order to obviate the difficulty. As a result, he had brought out a new hoop, which had been patented, and he thought was an improvement. The hoop shown was of galvanized iron, arranged with an ingeniously constructed clasp, so as to be in a moment unlocked, when the hoop opens, and the cheese can be taken out. This seems to us to be a very desirable article. It is very simple in its arrangement, being readily locked or unlocked in a moment.

NEW MILK AGITATOR.

Mr. Harris, of Antwerp, Jefferson county, was also introduced, who showed a new milk agitator to be worked with the waste water from the vat. The power consists of a long box, balanced in the centre upon pivots, and being divided into two compartments. As the water runs into one compartment, the box falls down, giving motion to the agitator. The other compartment is then under the stream, and as soon as the water is discharged from the first it rotates back, and thus is kept in motion.

Both of the above inventions were referred to a committee consisting of George M. Cleland, of Warren, and Alexis Johnson, of Schuyler, to examine and report upon their merits at next meeting.

Mr. L. B. Arnold, of Tompkins, being called upon to address the Club, said he was present with no expectation of taking part in the discussion to-day. He was always glad to be present at such meetings and hear farmers talk. He always obtained new ideas at their meetings, and received enough information to pay him well for coming. He felt to encourage the Club for what it had done. It had accomplished, through its discussion, a good work, not only for this immediate community, but for the country at large. He was satisfied it had done a large amount of good here at home. He could see the effects from the increased intelligence of the farmers and a better system of farming in the county than was obtained

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before its organization. The farmers had been worked up to think and read more of their business than formerly. It induced men to take a greater number of agricultural papers. He had seen quotations from the discussions of the Club in every agricultural paper in the land, and, as for himself, the proceedings of no similar body afforded him so much instruction and gratification. He hoped the Club would go on in its good work, since such an institution was a great honor to the country. In regard to the question under discussion, he had not made so many experiments with artificial fertilizers as many others; had used bone meal on corn crops, but with no apparent effect. The same might be said in regard to the use of plaster on corn, but upon red clover the effect was very marked. He did not know but there might be some peculiarity in the soil upon which the experiments had been made, as regards the corn crop, since his neighbors, using plaster, thought they derived great benefit from it. One of the best effects in his experience with fertilizers was in renovating seventy square rods of ground that had been rendered barren by being burned over, at the time of clearing, seventy years ago. It produced a few crops, which completely exhausted its elements of fertility. This piece of land was covered over with refuse from the tannery—hair, horn piths, lime and tan bark, all mingled together. The next year after manuring, the land grew corn fodder at the rate of twelve tons per acre. The next year barley was grown, but as it was drowned out there was no result. The next year the land was seeded down to grass. The crops were the largest he had ever seen, and the effect of the manure continued for several years. Had tried hair on meadow lands, and with great benefit.

The farming in Tompkins county differs from that in this section. It arises from the character of the soil and habits of the inhabitants. When he went there it was a grain raising county, and some butter was made. But it has been gradually growing into dairying. Now there are three cheese factories in the county, and three more are going up this spring. At one of these factories they manufacture the milk from 1,600 cows. The other two received the milk from 700 and 800 cows respectively. The increased product of cheese in the county the present year will be from 500,000 to 1,000,000 pounds.

Mr. S. A. Farrington, of Schuyler county, said the people of that county regard the prospects of butter making this year to be quite as remunerative as from cheese. There were four factories

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in that county. Two of the factories will not be run, as the farmers are turning their attention to butter-making.

The farming of Schuyler county is a mixed husbandry. It was originally a grain growing county, wheat succeeding barley. The average barley crop is from twenty to forty bushels. Sheep have been kept quite extensively in the county until within a year past. There has been a good deal of stock raised in the county. The general opinion of the farmers is that some other kind of farming besides grain-growing must be introduced.

Mr. F. said that along the Seneca lake they are going largely into fruit-growing—apples, pears and grapes. The pear succeeds admirably, but apples are troubled with the borer. Grapes succeed along the lake shore, and it is regarded as a very profitable business when well managed. It is generally conceded that five acres of grapes, to be cultivated properly, is about as expensive as the management of one hundred acres in the ordinary way devoted to mixed husbandry. The profits will be much in excess of the farm. This year there was raised from well managed vineyards, two tons of grapes per acre, which sold from eight cents to sixteen cents per pound. The grape soil is a shaly limestone that decomposes and furnishes sufficient fertilizing material for the grape. Do not manure the grape with barnyard or other manures, except ashes, as it is regarded prejudicial.

H. N. Tunnicliff, of Warren, said he had two mill dams where there was an accumulation of fertilizing deposit. He draws it out and spreads it in the fall upon meadows. It pays wonderfully in the increase of crops.

Mr. A. L. Fish, of Winfield, said that some twelve years ago he drew out 3,000 loads of muck, and after trying a portion of that upon his land, he applied it at the rate of fifty loads to the acre. He pulverized it and mingled it with the soil, and the result was good crops, without further cultivation. Two years afterwards he drew out 4,000 loads, and applied at the rate of 100 loads per acre, and spread with a plank, in which was attached a tongue to hitch on the team. The deposit was of a dark color. The land was planted to corn, and the muck drew the heat so much that the boys in hoeing time had to put on shoes to protect their feet. This deposit was composed of leaves and organic matter. In digging it out of the pit there was a strong smell of ammonia, and it affected the eyes and nose. After taking two crops off the land, put it down in meadow, and it had produced at the rate of two tons

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per acre ever since; but before the application, the produce was not a ton per acre. The first crops did not show the effects so plainly as lands treated with manures, but the deposit was more lasting. As a matter of economy, would always advise close attention to the saving of barn yard manures. Think liquid manures, applied in their full strength, and undecomposed, too strong for plants. Would dilute it or mix with some substance that would act as a divisor.

Mr. Arnold said liquid manures, when decomposed, produced better results at first, since ammonia is developed, which is the basis of all manures, but when applied before decomposition it is more lasting, and the phosphates are returned to the soil. He thought the liquid manures of equal value with the solid excrement for stock. From what he had learned to-day in regard to Herkimer county cattle eating bones and bone meal, it was evident the soil was becoming robbed of its phosphates.

Mr. Warren had used liquid manure with good result upon hops. He drew it out in a hogshead, and put about a pint on each hill.

Mr. Treadway, of Warren, had applied liquid manure to vines with the best results.

Mr. Eckler draws his manure from the stable every morning, and piles in heaps; he lets it lay until fall, and then spreads upon meadows. Never see any benefit from green manures used as a top-dressing.

Mr. Charles Warren thinks the most benefit derived from well-rotted manures, when applied as top-dressing on meadows.

Mr. R. Warren finds it a good practice to haul green manures out in plowing land, and turn it under.

Mr. Marshall prefers to draw out and spread manures in the fall, but green manures, if applied, should be incorporated with the soil.

Mr. Eckler prefers to use well rotted manures.

Mr. Treadway remarked that upon Judge Earl's farm where green manures had been drawn out and spread upon meadows profusely, the next year the cows were troubled with abortions. The suggestion has occurred to him whether this might not have something to do with the disease. There had been sixteen cases in the herd.

In regard to the question whether sheep or cows were best to

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keep up the fertility of the lands, Mr. Eckler thought there was but little difference.

Mr. A. L. Fish, on the other hand, remarked that the Exeter sheep farmers declared that sheep run out farms by biting the grass down too close.

Mr. Tunnicliff thought that sheep was a good kind of stock to keep up the fertility of soils, if you did not ask it to bite down to the grass too closely.

MANLIUS AND POMPEY.

The annual meeting of the Manlius and Pompey Agricultural Association was held at the Manlius Hotel, in Manlius, on Tuesday, January 21st, 1868. It appears by the treasurer's report, that the affairs of the Society are in a satisfactory condition.

Total receipts for the year	$611 25
Expenditures	425 23
Balance in treasury	$186 02

The number of members of the Association, as indicated by the money collected, is one hundred and eighty-five. The value of the cash premiums awarded at the late fair is eighty-six dollars.

Officers: President, George Butts; Secretary, Wm. Manlius Smith; Assistant Secretary, A. A. Tripp; Treasurer, Porter Tremain, Jr.

MORAVIA.

MORAVIA, *December* 22, 1867.

COL. B. P. JOHNSON, *Secretary of the New York State Agricultural Society:*

SIR—Our Moravia Agricultural Society, including the towns of Scipio, Venice, Genoa, Locke, Summerhill, Sempronius and Niles, would respectfully submit to the State Agricultural Society the following report:

That on the 27th and 28th of September last, we held our tenth annual fair, on our fair grounds in this village; said fair grounds containing about seven acres, well shaded with trees, and a new

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floral hall, judges' stand, secretary and treasurer's office, stalls and pens for the accommodation of stock, together with a fine graded one-half mile track for the exhibition and speed of horses.

Our tenth annual fair was all that could have been desired. The weather was fine. The show in all departments good; the crowd of people larger than at any previous fair. At our last annual meeting of the Society, our premium list was enlarged to the amount of six hundred and fifty dollars.

The entry of horses was very good, and many horses of great speed, style and beauty were exhibited.

The display of cattle the present year has never been excelled, in both grades and natives. The entries were one hundred and sixty, and all in good order. The town of Locke entered eighteen yoke of oxen in one string, which did great credit to their owners. Mr. William Seliver, of the town of Niles, exhibited his triplet steers, two years old, which were much admired.

Mr. Calvin Tracy, of Scipio, exhibited his herd of Durhams, which was highly complimented by the viewing committee. Among his herd was one two-year old steer, which cannot be beaten in the State.

Abram Freeman, of Scipio, exhibited two Durham cows, which were clear beyond competition.

The exhibition of sheep of all grades was never equalled in this section. Mr. Hiram Hand, of Genoa, received the highest premium on his thoroughbred three-year old American merino buck, and E. E. Brown, of Niles, the highest premium on his one-year old American merino buck. The competition among sheep was very strong, as a large number on exhibition were of superior quality.

The show of swine was not as large as some former years, there being only five pens on exhibition. The animals shown were very fine, showing superior breeding.

Many coops of very choice fowls, including barn-yard bantams, turkeys, geese, ducks and African geese, were on exhibition.

Our dairymen did well their part in the way of butter and cheese, all of which was No. 1 in quality. Our cheese factory, which is only six months old, had on exhibition packages of cheese, which came up to the best standard of any in the State, for which they always get the highest market price.

The show of fruit was very good, and the various specimens showed great interest in their growth and cultivation.

The display of vegetables showed that our gardeners were striving

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each to outdo the other. The display of farm implements and domestic manufactures was well represented. Also, that of mechanics and fine arts. and fancy articles, each giving due credit to their departments.

Floral hall did great credit to our ladies, for which they should receive the thanks of our citizens for the liberality with which they displayed specimens of needle-work and embroidery. The exhibition of domestic manufacture, together with the show of fine arts and fancy articles filled floral hall to overflowing.

This Society have paid, in addition to the regular premium list, a list of "special premiums," of which one was of twelve dollars to the best stallion being exhibited and showing the best family of not less than twelve colts of three years of age and under. Three three years old, three two years old, three yearlings and three sucking colts, of which A. W. Ranny, of Summerhill, took the premium. Also, a premium of fifteen dollars to any town for the best five yoke of oxen in a string, owned and exhibited by the same, of which Moravia was the winner.

The Society offered a special premium of fifteen dollars, and the president ten dollars for the greatest and best lot of American merino sheep of any sex or age. E. E. Brown took the special premium, and donated it back to the Society.

The second day of the fair was set apart for the exhibition of horses and trial of speed, which closed up our two days' fair with complete success.

The tenth annual meeting of the Moravia Agricultural Society was held in Cowan's Hall, of this village, January 15th, 1867, when the following were duly elected executive committee: William Titus, C. S. Jennings, Lyman Card, Clark Cowan, Alonzo Cutler, all of Moravia.

Cash on hand from last year	$346 00
Amount received at annual fair, 1867	1,004 50
Amounting to cash on hand	$1,350 50
Amount paid for premiums and expenses	740 50
Leaving on hand to the Society	$610 00

ELONDO GREENFIELD, *President.*

A. H. LIVINGSTON, *Secretary.*
M. L. EVERSON, *Treasurer.*

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MORIAH.

To the Secretary of the New York State Agricultural Society:

We the undersigned, president, secretary and treasurer, of the Moriah Agricultural Society, in conformity to section nine, chapter eighteen, title twenty-five, part one of the Revised Statutes of the State of New York, do hereby report as follows, to wit:

That the annual fair of said Society, for the year, 1867 was held at the grounds of said Society in the town of Moriah, county of Essex, on the 17th and 18th days of September, 1867.

That the books of the treasurer show:

Total receipts	$522 00
Total expenditures	431 93
Balance	$90 07

WALTER MERRILL, *President.*

THOS. WALTON, *Treasurer.*
GEO. D. MCKENZIE, *Secretary.*

SKANEATELES.

SKANEATELES, *January* 31, 1868.

R. P. JOHNSON, *Secretary New York State Agricultural Society:*

SIR—The labors of the Skaneateles Farmers' Club for the year 1867, though unattended by any remarkable strides of advancement—such as can be taken only at rare intervals in any department of human progress—have been such as to keep our Society in a healthy condition, and to lend encouragement for the future. The most prominent subjects before American farmers at the present time—wool-growing and dairying—were pretty thoroughly discussed at our last winter meetings. No lectures, strictly so called, were deliverd before the Society. Lectures mainly teach farmers to listen; debates teach them to think. And after farmers have debated for a while longer, may we not reasonably hope for better agricultural lectures than are readily procurable at the present time? When farmers wish to hear what is exactly adapted to their needs, and for their own interest, is it not manifest, in reason as well as in experience, that they must not look to those whose chief education and interests are in other pursuits than agriculture, but must seek their own counsels and do their own talking, mainly?

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Our thirteenth annual fair was a decided improvement upon the previous fairs of two or three years. The weather was favorable and the attendance good, visitors plenty, and the lack of competitors the only short-coming. This was the second fair at which we have given premiums of agricultural periodicals and books, without any diplomas; and it is evidently a great improvement upon the old plan of dealing out diplomas by the ream. It gives better satisfaction, and extends the beneficial influences of the fair throughout the year, or a longer time.

Our funds were raised by membership fees, private subscription, and an admittance fee at the gate, for teams only, of those who were not members of the Club. I mail you a printed copy of our premiums awarded, to whom, &c.

Your obedient servant,

CHAUNCEY B. THORNE, *Secretary.*

SCHENEVUS VALLEY.

Annual report of the Schenevus Valley Agricultural Society, of Otsego county, for the year ending December 21st, 1867.

We the undersigned, officers of said Society, beg leave herewith to present the following report:

Receipts of the Society for the past year	$910 60
Expenditures	910 60

The officers for the year 1868 are: President, James McKown; Secretary, W. W. Cone; Treasurer, James M. Thompson.

JAMES McKOWN, *President.*

J. FENN, *Secretary.*

S. W. GURNEY, *Treasurer.*

SUSQUEHANNA VALLEY.

UNADILLA, OTSEGO COUNTY, N. Y., *January* 22, 1868.

To B. P. JOHNSON, *Corresponding Secretary of New York State Agricultural Society:*

The eleventh annual fair and cattle show of the Susquehanna Valley Agricultural Society was held at Unadilla, Otego county, N. Y., on Wednesday, Thursday and Friday, September 25th, 26th and 27th, 1867.

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The territory embraced in the jurisdiction of this Society consists of eight towns, viz: Unadilla, Otsego and Butternuts, in the county of Otsego; Sidney, Franklin and Masonville, in the county of Delaware, and Bainbridge and Guilford, in the county of Chenango, covering an area of 270,000 acres, with a population of 19,000. This territory is a fertile and productive region of country, well adapted to grazing purposes, dairying and raising of cattle. The people are industrious and intelligent, and since the introduction of the Albany and Susquehanna railroad, a new impetus has been given to thrift and enterprise. The State is beginning to reap the benefit of aid extended to this road in the enhanced value of property, and consequent increase in taxation all along the line, and in opening up a new channel of commerce to and from the seaboard.

The grounds used by the Society contain fifteen acres, beautifully located on a rising eminence, which commands a view of the whole village of Unadilla and its surroundings, and is admirably adapted to the purpose. The grounds are inclosed by a good and substantial fence; a fine track, of half a mile, is graded, and a secretary's office and victualling hall is erected on the grounds. The Society also own and use an ample tent for floral hall, all of which cost some $2,000, of which over $800 was subscribed and given to the Society by the people of the village of Unadilla.

The first day of the fair was rainy, yet the entries were large, numbering over 800. The second and third days were fine, and drew together a large concourse of people, perhaps larger than at any previous year, the number of membership tickets sold being over 800, at $1 each. The Society offered in premiums over $900, including many agricultural papers, thus disseminating much knowledge of scientific farming in this section of the State. If we had the valuable Transactions of the New York State Agricultural Society for distribution, it would be very advantageous.

The report of the treasurer, Mr. F. A. Sands, at our annual meeting, shows the healthy financial condition of the Society:

Receipts	$1,337 88
Expenditures	1,181 80
Balance in treasurer's hands	$156 08

We had an excellent address from X. A. Willard, agricultural editor of the *Utica Herald*, which was replete with practical suggestions, and worthy of publication, could it have been procured.

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The show of cattle, horses, sheep and swine was large, and highly creditable to the exhibitors, especially that of horses, many being of peculiar excellence.

The exhibition of fruits and vegetables gave evidence of the fact that it only required the skill and attention of fruit growers to produce beautiful specimens and choice varieties.

The display of articles in the ladies' department was unusually large. All the towns did remarkably well in their contributions; and much credit is due in this particular in adding to the interest and making the tent an attractive feature of the occasion. It has been a conceded fact for years that our floral hall was the best in the country round, and 1867 fully sustained its reputation.

In only one department was the show small—the mechanical. We hope for a favorable change in this particular at our next fair.

Very respectfully,

GEORGE B. FELLOWS, *Secretary.*

THORNHILL.

THORNHILL, *February* 1, 1868.

B. P. JOHNSON, *Secretary State Agricultural Society:*

SIR—The Thornhill Farmers' Club have but little to report for the year just past. The Club have, besides holding regular meetings, held a fair and sheep show, which, owing to the backwardness of the season, was not as much of a success as former ones have been.

The condition of the treasury is very satisfactory, there being a balance of forty dollars after paying all dues.

Our library is in very good condition, and receiving occasionally new volumes.

The officers for 1868 are: President, Silas A. Wright; Corresponding Secretary, E. Corning Cowles; Recording Secretary, Allen Brown.

Yours respectfully,

ALLEN BROWN, *Secretary.*

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TRENTON UNION.

To the Secretary of the New York State Agricultural Society:

The undersigned, officers of the Trenton Union Agricultural Society, would herewith present their annual report for the year ending January 25th, 1868.

Gross receipts	$1,233 98
Total expenditures	1,127 66
Balance	$106 32

The annual fair was held on the 1st 2d and 3d days of October, 1867. It was the most successful fair we ever held; the show of stock and vegetables much exceeded the Oneida and Herkimer county fairs. The receipts amounted to $1,032.80; premiums paid, $782.75.

The following officers were elected for the ensuing year: Col. Walter Fowler, President, H. Patent; George King, Secretary, North Gage; D. W. Rhodes, South Trenton.

M. A. BLUE, *President.*

STORRS BARROWS, *Secretary*
GEORGE KING, *Treasurer.*

VERNON.

The Vernon Agricultural Society, at their annual meeting, January, 25, 1868, elected the following gentlemen officers of the Society for the ensuing year: President, Harlem Norton; Secretary and Treasurer, L. A. Griswold.

VIENNA.

To B. P. JOHNSON, Esq., *Secretary New York State Agricultural Society:*

DEAR SIR—The following is the report of the Vienna Agricultural Society for the year 1867:

The receipts from all sources were $246.50; the amount of premiums paid, 120.85. The officers were C. Woglum, President; Henry D. Eaton, Secretary; James P. Johnson, Treasurer.

The display of stock at the fair was not quite as good as some of the former exhibitions. The display in floral and vegetable halls was excellent. Altogether the fair was a decided success. It was held on the 1st and 2d of October.

H. D. EATON, *Secretary.*

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WINFIELD.

WINFIELD, *January* 2, 1868.

The annual fair of the Winfield Union Agricultural Society was held September 25th and 26th, 1867. Whole number of entries, 793.

Balance in treasurer's hands as per last report		$342 68
Receipts since date of last report		712 57
		$1,055 25
Premiums paid	$389 75	
Expenses as per report	281 06	
Balance in treasurer's hands to date	384 44	
		$1,055 25

Number of books received from State, twenty, which have been awarded as premiums. Valuation of Society's property, $250.

TAYLOR W. MORGAN, *President.*

JAMES B. MURRAY, *Secretary.*
J. W. WARNER, *Treasurer.*

ULYSSES, COVERT AND HECTOR.

TRUMANSBURGH, *September* 1, 1868.

Hon. B. P. JOHNSON, *Secretary of New York State Agricultural Society:*

DEAR SIR—Having learned that no report of the proceedings of the Union Agricultural and Horticultural Society of Ulysses, Covert and Hector, for the year 1867, had been forwarded to you, and hoping that it may yet be in time for your report, I make the following statement:

Our ninth annual fair was held on the Society's new grounds, October 2d, 3d and 4th, 1867. The members of the board had spent much time and thought in endeavoring to adopt such regulations as would best promote the interests of the Society, and they believe that all who participated in the fair felt satisfied, and were greatly encouraged in reference to the future success of the Society.

The exhibition, in all the various departments was highly creditable, and a growing interest in the prosperity of the Society was manifested by the members. The weather was favorable and the attendance large.

The board had incurred a debt of $465 in removing the buildings from the old grounds, and in grading and beautifying the

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new, but the success of our fair proved that it was money well expended.

Total receipts for the year	$1,640 65
Total disbursements	1,480 51
Balance	$160 14

Leaving us free from debt and $160.14 in the treasury.

Our annual meeting for the election of officers was held January 11, 1868, and resulted in the election of the followiug: Milo V. Cole, of Covert, President; J. H. Biggs, of Trumansburgh, Secretary; E. Camp, of Trumansburgh, Treasurer.

Very respectfully yours,

J. H. BIGGS, *Secretary.*

WASHINGTON COUNTY—First Assembly District.

CAMBRIDGE, *January* 1, 1868.

B. P. JOHNSON, Esq., *Secretary New York State Agricultural Society:*

SIR—I have the honor to make the following report:

The Horticultural, Pomological and Floral Society of the First Assembly District of Washington county, held its first annual fair in the village of Cambridge, on the first and second days of October last.

The following is a correct statement of the financial condition of the Society for the year ending December 3d, 1867:

RECEIPTS.

For membership	$72 00
For admittance fees to fair	143 50
Total	$215 50

DISBURSEMENTS.

For incidental expenses	$96 67	
For premiums	33 50	
		130 17
Balance in treasury at date		$85 33

Officers: President, Henry C. Gray, M. D., Cambridge; Corresponding Secretary, Lewis Potter, Easton; Recording Secretary, J. D. Stewart, M. D., Cambridge; Treasurer, Azor Culver, Cambridge.

Respectfully submitted,

AZOR CULVER, *Treasurer.*

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YORKTOWN.

YORKTOWN, WESTCHESTER CO., N. Y., *February* 18, 1868.

HON. B. P. JOHNSON, *Secretary New York State Agricultural Society:*

DEAR SIR—On the 2d, 3d and 4th of October last, the eleventh annual fair of the Yorktown Agricultural Society was held on the farm of Major Alsop H. Struang.

The use of his farm for this purpose has been tendered gratuitously to our Society for several years past (we not having as yet permanently located our annual exhibitions by the purchase of ground).

The attendance was all we could have expected, and the show, on the whole, exceeded any before held in the town. The display of fruit and vegetables was remarkably fine for the season; indeed it was said to exceed that of Westchester or Putnam county, while their receipts far exceeded ours. Why? We had no race-course. This is so rapidly becoming the prominent feature of our county agricultural fairs, that (so far as my observations go), where they have the best track, they have the least to show, except fast horses. It has always been the aim of the managers of this Society to make its fairs agricultural and mechanical purely, believing that to admit horse racing, would destroy the object of the Society.

On the last day (4th), we were ably addressed upon the subject of agriculture, by Hon. Elliot C. Cowden, of New York city.

Following is our financial report, together with a list of officers elect.

Balance in treasurer's hands, 1867	$205 84
From memberships, entrance fees, &c	674 13
Total	$879 97
Premiums and expenditures	495 27
Balance in treasury, December 30, 1867	$384 70

President, J. B Tompkins; Treasurer, H. W. Hart; Secretary, Constant White, all of Yorktown, Westchester county; Corresponding Secretary, Egbert S. Fowler.

JOHN B. TOMPKINS, *President.*

CONSTANT WHITE, *Secretary.*

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ADDRESS

ON THE

PROGRESS OF AMERICAN DAIRYING.

PREPARED FOR THE ANNUAL MEETING OF THE NEW YORK STATE AGRICULTURAL SOCIETY, FEB. 12, 1868.

BY X. A. WILLARD, OF HERKIMER COUNTY, N. Y.

The Dairy has become an important branch of national industry. It is rapidly spreading over new fields. It is engaging the attention of farmers in the Western, Northwestern and Middle States, wherever lands are adapted to grazing and there are springs and streams of living water.

The history of American dairying has never been written. Perhaps a brief glance at its rise and progress as a speciality will not be out of place.

Herkimer is the oldest dairy district in America. I knew the man, in his old age, who first began cheese dairying in Herkimer. He came into the county, on foot, from New England, nearly eighty years ago. He was rich in health and strength. He had eight silver shillings in his pocket, an axe upon his shoulder, and two stout arms to swing it. Nearly the whole county was then a dense forest. Brant and his Mohawks had been gone several years, but traces of their pillage and murders were fresh among the early settlers in the valley and along the river.

The old Dutch heroine, Mrs. Shell, was then living in the county. She was a noted character. When the Indians beseiged her log house, she fought side by side with her husband all day and all night, battering the guns of the Indians with an axe as they thrust them through the logs, and firing at the assailants until help came from the fort.

The house stood on the great black slate hills rising near the Mohawk to the north. Beyond was a valley, and a still higher elevation. Here the sturdy young New Englander picked his land. His stout arms felled the timber over many acres. He built

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his log house, and established a herd upon the soil. Then he took to wife a Cheshire girl, who made the first cheese dairy in the State.

This man's name was Arnold. He accumulated large wealth, was of the strictest integrity, and went to his rest honored and respected.

From such beginnings sprang the mighty giant that is now stalking over the Continent, dotting the land with countless herds.

Perhaps the strength of this interest can best be given in figures. American dairying now represents a capital of more than *six hundred millions* of dollars. The cheese product this year has sold for $25,000,000, and the butter product for at least $100,000,000. In 1864, the butter product of New York alone, was nearly 85,000,000 of pounds, and the cheese 72,000,000 of pounds. The value of these products, at a very moderate estimate, was more than $50,000,000.

The wheat crop of the State, in 1864, was 6,000,000 of bushels; oats, 19,000,000; rye, 2,000,000; barley, 3,000,000, and corn, 17,000,000. *The product of the New York dairies, therefore, sold for more than the entire grain crop of the State.*

The wool clip of the State, that year, was not quite 16,000,000 of pounds, which, at a dollar a pound, would amount to less than one-fourth that from the dairy. There has been a large increase of dairy farming in New York since 1864.

Looking carefully over the census, I fail to find any other agricultural interest in the State that can begin to measure arms with the dairy; for if we add the value of pork made from whey, the calves raised, and the beef and milk sold, we can hardly get the annual product from the dairy farms of New York, below *a hundred millions of dollars.*

Am I wrong, therefore, in supposing the dairy farmers of New York to be the most powerful body of agriculturists, devoted to a speciality, in the State? It is remarkable how rapidly this interest has been developed.

In 1840, the value of the dairy products of New York—butter, cheese and milk—was estimated by the United States census at only $10,496,000, and in all the States, at about $34,000,000.

In 1850, the product of butter in the United States and Territories was 313,345,306 pounds, and the cheese 105,535,893 pounds. In 1860, the butter product had reached 469,681,372 pounds, and

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the cheese 103,663,972 pounds. The value of these products that year could not have been less than $200,000,000.

From the best information we can get, the cheese product from the dairy districts, in 1867, has amounted to 200,000,000 of pounds, half of which has been made in the State of New York.

Between 1840 and 1850, American cheese began to be shipped abroad, the first shipments having been inaugurated by Herkimer county dealers. In 1848–9, the exports of American cheese to Great Britain were a little over 15,000,000 of pounds.

Much of the cheese manufactured that year was poor in quality, and British shippers claimed to have sustained heavy losses. There was a more moderate demand the following year, and prices fell off a penny a pound, varying, from fair to strictly prime, from 6 cents to 6¾ cents.

The exports of 1849–50, were 12,000,000 pounds, and continued to vary, without important increase, for several years. In 1860, the exports had reached 23,000,000 of pounds, and were increased the following year to 40,000,000.

About this time the associated dairy system began to attract attention. Several factories were in operation in Oneida county, and were turning out a superior article of cheese. The system had been first inaugurated by Jesse Williams, a farmer living near Rome, in that county, and was suggested from mere accidental circumstances. Mr. Williams was an experienced and skillful cheese-maker, and at a time when the bulk of American cheese was poor. His dairy therefore enjoyed a high reputation, and was eagerly sought for by dealers. In the spring of 1851, one of his sons, having married, entered upon farming on his own account, and the father contracted the cheese made upon both farms, at seven cents per pound, a figure considerably higher than was being offered for other dairies in that vicinity. When the contract was made known to the son, he expressed great doubt as to whether he should be able to manufacture the character of cheese that would be acceptable under the contract. He had never taken charge of the manufacture of cheese while at home, and never having given the subject that close attention which it necessarily requires, he felt that his success in coming up to the required standard would be a mere matter of chance. His father therefore proposed coming daily upon the farm and giving the cheese-making a portion of his immediate supervision. But this would be very inconvenient; and whilst devising means to meet the difficulties,

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and secure the benefits of the contract, which was more than ordinarily good, the idea was suggested that the son should deliver the milk from his herd daily at the father's milk-house.

From this thought sprung the idea of uniting the milk from several neighboring dairies, and manufacturing it at one place. Buildings were speedily erected and fitted up with apparatus, which, proving a success, thus gave birth to the associated system of dairying, now widely extended throughout the Northern States.

The system of associated dairies, during the last eight years, has been carried into the New England States and into the Canadas. It is largely adopted in Ohio, and has obtained a foothold in Wisconsin, Illinois, Iowa, Kansas, and other States. It is known abroad as the "American System of Dairying," and its peculiarities are so well adapted to the genius of our people, as to give it a distinctive character of nationality.

THE EXPORTS.

We have given the exports of cheese in 1861, at 40,000,000 pounds. In 1862, the exports were, in round numbers: cheese, 39,000,000 of pounds, and butter, 29,000,000; in 1863, cheese, 41,000,000; butter, 23,000,000; in 1864, cheese, 46,000,000; butter, 14,000,000; in 1865, cheese, 47,000,000: butter, 22,000,000; in 1866, cheese, 45,000,000; butter, 5,000,000. For the past year, 1867, the exports of cheese are expected to reach 55,000,000 of pounds.

ENGLISH PRODUCTION, AND IMPORTS FROM HOLLAND.

According to the estimates of the English shipper, Mr. Webb, the product of cheese made in Great Britain, the past year, has been 179,000,000 of pounds. We have no estimate of the quantity of cheese made in Holland.

In 1866, I was in Europe, and obtained, for the American Dairy Association, the quantity of Dutch cheese sent to England. It was, for that year, 80,000,000 of pounds.

An approximate estimate of the annual consumption of cheese in Great Britain, may be gathered from the following figures: English home make, 179,000,000; imports into England from Holland. 80,000,000; from the United States, 50,000,000: making the total English consumption 309,000,000 of pounds.

During the past season American cheese has sold at low figures, in many instances below the cost of production.

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CHEESE CONSUMPTION, ETC.

Fears are entertained that we have reached the limit of over-production. Time of course must decide this question; but in the meanwhile, a knowledge of the ordinary consumption of cheese in the United States and Great Britain may be a help on which to base future operations.

From careful estimates, it appears that the consumption of cheese in the United States and Canada is now about 160,000,000 of pounds annually. This makes 469,000,000 as the consumptive demand in Great Britain and America. Against this we have the product of cheese made in Great Britain, 179,000,000; product of United States, 200,000,000: Canada produced 15,000,000; making a total of 394,000,000 of pounds. Quantity lacking to supply the two nations, beyond their home make, 75,000,000 of pouuds.

Mr. Webb informs us that France has become a competitor with England for Dutch cheese, and that hereafter the imports into Great Britain from this source must decrease.

On the other hand, *Sweden* is entering the field as a dairy district, and will compete hereafter with the United States in the English markets. Already the Swedes are turning their attention to the Factory system, and during the past season some of their dairies have outsold the finest grades of American in the English market.

All these facts would seem to indicate that *there is danger of pushing cheese dairying in America, beyond ordinary consumptive limits.*

Some of the leading men at the South are proposing to try the dairy in various localities. A cheese factory is already in operation in North Carolina, but many question whether the dairy can be successfully carried into warm climates.

In regard to the quantity needed abroad, Mr. Downes, Secretary of the London Board of Trade, writes me in a recent letter, that Americans should bear in mind this fact: "That the population of Great Britain doubles every forty years, and hence the consumptive demand for cheese will be in proportion to the increase in population;" or nearly at the rate of 90,000,000 pounds per year.

This consideration, with the fact that there is great probability of a very important decrease in the make of English cheese, from year to year, gives hope that the dairying business may be sustained in this country, if our people continue their efforts to improve the *qualities of both butter and cheese.*

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In the development of this interest much has been done by the New York State Agricultural Society. It has published elaborate treatises upon the dairy. It has given abundant and timely information from all sources. Liberal premiums at its State Fairs have been offered for dairy products. Some of its cheese and butter shows have been among the best and largest in the world.

Whatever may be said of the labors of this Society, it has been fortunate in its selection of officers—in securing men who have had the best interests of agriculture at heart; men who have striven to promote its progress, and have wisely extended the fostering care of the Society over all interests.

So valuable have the "Transactions" of this Society become, that the volumes have all the force and character of standard works. It is the "Farmer's Book," and has done vast service for improved agriculture and progress.

I have traveled much among the farmers of the State, and know well their sympathies and feelings, and I can say honestly and truthfully (and it is due that it should be said), no man's services in the cause of agriculture are more highly appreciated than those of your venerable Secretary, and no man is more loved or admired by the farmers of the State.

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TWELFTH REPORT

ON THE

NOXIOUS, BENEFICIAL AND OTHER INSECTS,

Of the State of New York.

BY ASA FITCH, M. D.

BUFFALO TREE-HOPPER, *Ceresa bubalus*, Fabricius. (Homoptera, Membracidæ.)

Wounding raspberry stalks, grape vines, and apple twigs, in autumn, by piercing them with numerous holes placed regularly in a straight row some two inches in length or more; a beech-nut shaped tree-hopper of a grass-green color, and having anteriorly on each side a short sharp point projecting horizontally outwards and resembling the horns of a bull or buffalo.

A figure of this insect and a brief general notice of it was given in my Third Report (Transactions 1856, page 335). Important additional facts in relation to it have since been obtained, whereby I am now able to present a full account of its habits and transformations. Some of these facts have already been communicated to the public in an article in the *American Agriculturist*, June, 1862 (vol. xxi, p. 172).

In the winter and spring a peculiar kind of crack or scar is sometimes observed on the twigs of the apple, cherry, willow and other trees, extending lengthwise of the twig, from half an inch to three inches in length. It occurs on twigs which are nearly or quite a quarter of an inch in thickness, and two or more of these scars are sometimes seen at different points along the same twig. Their surface is raised slightly above the level of the bark and has a rough, cankered appearance, with a deep crack along the middle, in which crack a row of small holes is more or less distinctly to be seen, extending the whole length of the scar. Upon splitting the twig it is discovered that these holes are bored downward into or quite through its pith, in an oblique or slanting direction, each hole being somewhat bent or curved, and occupied by the egg of an insect.

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BUFFALO TREE-HOPPER. ITS EGGS. IN A ROW OF HOLES.

These *eggs* are shining, yellowish-white, cylindrical, with rounded ends, and about four times as long as thick, their length being a little more than the tenth of an inch, and exactly filling the holes for about two-thirds of their length.

If a twig be paired off with a knife upon the side opposite to the scar and crack, until the ends of the eggs are come upon, these are there observed to be arranged in two rows, although the holes in the bark are in a single row. And in splitting a twig in two to expose the holes, if it be done accurately, half the eggs will remain in one piece, and half, alternately with these, will be in the other piece. This curious arrangement is evidently caused by the artistic manner in which the ovipositor is inserted into the twig. Instead of sinking this implement inward through the exact centre of the pith the insect gives it a direction slightly to one side, first to the right, next to the left, then again to the right, thus alternately changing with each hole she successively perforates. Hereby the eggs have more space between them than they would have were they deposited in a single row. I conjecture it is to enable the eggs to swell and increase in size without crowding against each other, that they are thus arranged. Although it is quite an anomaly for an egg to grow and enlarge, the fact is well ascertained that the eggs of some of the saw-flies which are deposited in the soft and spongy pith of plants do swell and become larger before they hatch than they are when first laid. And the eggs of this tree-hopper have such a plump appearance, and fill the holes so compactly that it would seem they must have been smaller to admit of their being crowded into a space so contracted.

These same scars occur also in grape vines. But it is in the stalks of the raspberry that they are most common and occasion the most damage. They are met with in the stalks of the wild black raspberry or thimble berry as it is sometimes called (*Rubus occidentalis*), and of the red raspberry also (*R. strigosus*); and they are liable to be quite numerous in the cultivated garden raspberry (*R. Idæus*). In the *Rural New Yorker*, May 11, 1867 (vol. xviii, p. 151), Dr. F. H. Guiwits of Clinton, Michigan, states that "Almost every cane of my raspberries, both black and red, has been pierced by some insect depredator, with small perforations the size of a pin, in each of which, in the pith of the cane, I find an egg about an eighth of an inch long, of a whitish color. These perforations occur in rows and very close together. The rows are

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from half an inch to half a foot long, and sometimes several rows on a cane. Above these nests the cane is dead. The most of them are as much as two feet from the ground. The prospects of my berry crop are diminished at least one-half in consequence of this."

In a black raspberry stalk I count eighty-one punctures in a row three inches and a fourth in length, indicating that this number of eggs was laid by one of these tree-hoppers at one time and without any remission of its work. The number of holes in a row one inch in length I find to be from twenty-five to twenty-seven.

In the year 1858 the apple trees at Akron, Ohio, and its vicinity, were extensively injured by these wounds upon their twigs. The malady attracted the notice of H. W. Howe, Counsellor at Law, of that place, who forwarded to me specimens of the wounded twigs, and some correspondence hereupon followed between us. Upon being informed how much of a novelty these wounds were, and that the insect making them was unknown, he devoted particular attention to this subject, and at length was so fortunate as to detect the culprit in the very act of piercing these holes, and specimens of it were thereupon sent to me. It is thus to Esq. Howe that we are indebted for knowing what insect it is which causes these wounds, and the manner in which it makes them.

This insect begins to be seen soon after the middle of July, each year, and remains till the end of the season. It is so common throughout the Northern States and Canada, and has such a peculiar form that every observing person has probably at some time noticed it. It is from three to four-tenths of an inch long, of a light grass-green color faintly freckled with whitish dots, and is three-sided, like a beech-nut in shape. At its forward end, jutting out horizontally upon each side is a short sharp-pointed process, these two projecting points looking like a pair of horns, giving it some resemblance to a bull or buffalo, from which circumstance it has received its name. It may frequently be seen on the small limbs of the apple tree, the locust and other trees in our orchards and yards, standing with its head towards the base of the limb. It there remains perfectly motionless and quiescent. But if the finger approaches it, with a sudden strong spring it darts away with such velocity that the eye is seldom able to follow it or even catch a glimpse of the direction in which it has thrown itself.

The piercer, lancet or ovipositor, the instrument with which this tree-hopper perforates the holes in the stalks of the raspberry and

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the twigs of trees, closes into its sheath much like the blade of a pocket knife in its handle. It is plainly to be seen thus closed and lodged in a groove on the underside of the body at its hinder part. To perforate a hole, Esq. Howe informs me this piercer is held obliquely forward and downward, like a knife blade a quarter opened. Being in this position and its point pressing against the bark, it is by a forward movement of its body that the insect thrusts it downward through the bark and soft wood and into the pith. An egg is then passed through this implement down into the hole it has made, and it is thereupon withdrawn and placed in position for making another hole. The wounds which it thus makes are scarcely perceptible at first, but become more and more conspicuous with age. It was the last of September when Esq. Howe discovered the insect at this work, and some of the wounds in the twigs he judged from their appearance had been made a month earlier.

The eggs remain in the pith of the stalks or twigs where they are deposited, through the winter and spring, hatching the fore part of June. They do not produce worms, but small active larvæ which resemble the parent insects in their shape.

The *larvæ*, when I have first noticed them, about the 20th of June, were one-tenth of an inch long, 0.06 high and about 0.03 wide. They are of a compressed triangular form, of a leaf-green color, and a soft fleshy texture, with two rows of long spines along the back, eleven in each row. These spines are soft and flexible, and bearded with fine bristles. Two are placed upon the summit of each segment except the head and the tip. They project upward and curve outward, except the forward pair which are curved strongly forward over the head, and the hind pairs which are inclined backward. The head and legs and the lower edges of the body are bearded with fine bristles. The last segment is a cylindrical tube equalling in its length the three or four segments forward of it. This tube has a pair of small spines at its tip on the upper side and is bearded with fine bristles along its underside.

These larvæ station themselves upon the succulent stalks of plants, at the axils of the leaves, where they so much resemble the young buds which start out at this point, that it is only on looking particularly that they are detected. They stand there motionless, with their beaks inserted into the stalk, sucking its juices, which constitute the nourishment of this insect both in its larva and its

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perfect states. They are hereby pernicious to the vegetation on which they occur, as well as by wounding it to insert their eggs. The juices of the dahlia appear to be especially palatable to them, for they infest this much more than any other of our cultivated plants, and unless resisted they are liable to become gathered upon this plant in such numbers as to occasion it much injury.

In seasons when these leaf-hoppers are noticed as being so common upon our fruit trees and shrubs as to excite apprehensions that they will be detrimental, it will be well to frequently shake and jar the vegetation on which they abound, in order to frighten these insects away; for they are so shy and timorous that I think few of them will remain where they find they are liable to be thus disturbed, but will fly away to the fields and forests where is vegetation that will accommodate them as perfectly as does that of our orchards and gardens. When young, small and destitute of wings for flight they are less agile than when they are full grown, and are more easily captured; and it will be well, the latter part of June, to occasionally look over the dahlias and other cultivated plants on which any of these young ones are discovered, and pick off and destroy them, in company with the young of the Yellow-lined Leaf-hopper, which, as stated on a subsequent page, frequently occur upon these same plants.

YELLOW-LINED LEAF-HOPPER, *Gypona flavilineata*, Fitch. (Homoptera, Tettigoniidæ.)

Puncturing the leaves of the dahlia and extracting their juices in July and August, a flattened oval pale green leaf-hopper, about 0.40 long, with eight faint yellow stripes upon its thorax, the middle ones prolonged upon the head and scutel.

RED-LINED LEAF-HOPPER, *Gypona octolineata*, Say.

An insect similar to the preceding in size, form and habits, but having the stripes upon its thorax bright red and also the veins of its wing covers.

These two insects will best be considered in connection, being so intimately related that they have been regarded as only varieties of one species, although to the eye they differ conspicuously in their color, and the one is common whilst the other is quite rare.

They were first noticed by Mr. Say, who in the year 1825 published a description of the Red-lined species in the *Journal of the Academy of National Sciences*, vol. iv., page 340, where he also refers to the yellow-lined species as being a variety of the same

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insect. He had before him but a single specimen of the former and probably a few only of the latter. In 1851 when my Catalogue of the Homopterous Insects in the *State Cabinet of Natural History* was published I had met with only two of the Red-lined species but had gathered as many as I desired of the others. Their colors were so widely different and were so constant in every instance—the yellow-lined ones being of both sexes, and no part of any one of the multitude of examples which I inspected presenting any tinge of red to indicate to me that the two colors might gradually pass into each other—that I did not hesitate to regard them as being specifically distinct, and treated them accordingly. But as Mr. Say indicates no doubt of his correctness, I could not divest myself of the suspicion that he had seen some instance in which the stripes were partly red and partly yellow, or so colored otherwise as to be intermediate between the two extremes. Years passed away, and I continued to collect numbers of the Yellow-lined insects without meeting with any example to shake my confidence in the correctness of the view I had taken. Upon meeting with the larvæ and pupæ of this species on the dahlia, the query occurred to my mind, whether, if an individual that was young and growing were to sustain itself a portion of the time upon the brilliant red flower leaves of this plant, it might not acquire a red color thereby, and thus grow to be the Red-lined instead of remaining the Yellow-lined species. And I was revolving it in my thoughts how I could test this by experiment, when, in August 1865, I was taken quite by surprise in meeting upon the dahlia with what appeared to be one of these Yellow-lined Leaf-hoppers having the basal half of its thorax pale with the stripes upon it crimson and the inner margin of its wing covers also tinged with this color. Thus, after I had been gathering and inspecting these insects upwards of twenty years, a specimen such as I was in pursuit of presented itself to me, seeming to be intermediate between the two species in question, having its stripes partly red and partly yellow. I had all along suspected that Mr. Say had seen a specimen similar to this, which had led him to regard the Yellow-lined examples as a mere variety, and I hereupon supposed that I was probably in error in elevating them to the rank of a distinct species. A few weeks afterwards, a second specimen similarly colored presented itself to me, and now, three years later, a third one comes to hand. And upon noticing that these three examples were nearly alike, the

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POINTS OF DIFFERENCE BETWEEN THESE TWO SPECIES.

same parts taking on the red color in each instance and thus indicating this coloring to be constant, it began to appear as though these were a third species instead of a connecting link between two remote varieties. I thereupon resolved to give this matter a thorough re-examination, to determine the true relations of these respective individuals to each other. During nearly a score of years another specimen of the Red-lined species has come to me, whereby I have three examples of it before me for comparison, and quite a number of the Yellow-lined species. I first remark that several of the latter are of a larger size than either of the former, and that each of the partly red examples are small, though some Yellow-lined males are equally small. And I next notice the important fact that the partly red examples are each one males, and those which are wholly red are females, and from my notes I learn that the red specimen in Dr. Harris's collection is also a female. It thus appears that this remarkable difference in their colors is sexual. Mr. Say, however, states that the specimen from which he drew his description was a male. But I am constrained to suspect he was in an error. In females which are newly disclosed from the pupa, and before the ovipositor has been protruded for use, the tip of the abdomen is small and undeveloped, whereby they at first glance appear to be males, and in such cases it is only on a close examination of good specimens that the sex can be accurately determined. Further observations will, I think, establish it as a fact that the Red-lined specimens are all females and those that are partly red are their males, as some other species of this family present equally remarkable differences in the colors of the two sexes.

On coming next to particularly examine and compare the several specimens, I discover such differences in some of the details of their structure, their colors and also their habits, as conclusively show the yellow-lined ones to be a distinct species from those which are partly and wholly lined with red. The latter have the whole surface of their wing covers netted with veins and veinlets, whilst the former have them thus netted only at their tips, the longitudinal veins on the disk and base of the wing covers being unconnected by short transverse veinlets, save in the middle cell, which is crossed by three or four of these veinlets, the corresponding cell in the red-lined species always having a larger number than this. On the head of the yellow-lined species the two middle stripes are parallel

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and equidistant from each other their whole length, whilst in the red-lined species they converge and are united together through the anterior half of their length. The eyelets or ocelli are placed within the outer sides of these stripes in the former species. whilst in the latter they are wholly outside of the outer edges of these stripes. Other differences which are less conspicuous it is unnecessary to mention. One point, however, in which they differ in their habits merits to be stated. Notwithstanding the Yellow-lined Leaf-hopper is so very much more common and so frequently inhabits the vegetation around our dwellings, I have never known an instance in which it has been attracted by the light of the lamp to enter open doors or windows upon summer evenings; whilst of the six specimens, male and female, of the Red-lined Leaf-hopper which I have in hand, four were taken within doors, either alighted around a lamp in the evening, or upon the closed windows by day, these latter having doubtlessly entered the lighted rooms in the evening and flew to the windows to escape when daylight arrived.

I may here remark further, with regard to these pretty rose red insects, which we are liable to meet with within our dwellings, and which look as though they might be thus colored from being stained with blood, that they are extremely agile, darting with such velocity as almost to be imperceptible; and without any rustling of its wings or other noise to indicate its approach, one of them drops in the glare of the lamplight upon the papers close beside our hand, so suddenly and silently that, seeing it where it had not been a moment before, it seems like a spectre that has supernaturally arisen there.

The history of one of the specimens in my hands is so singular and interesting that it is well entitled to be narrated. It was brought to me by a physician from a neighboring town who gave me the following account: A patient under his care, a young lady, vomiting in a clean white washbowl, suddenly noticed this bright red insect in the bowl, upon the matter vomited, and she and her attendants were certain that she had thrown it from her stomach. He wished to know if this was possible, and if an insect like this had ever before been seen. I was able to immediately show him another specimen exactly like the one he brought, and to assure him that this latter had never been touched by the digestive juices of the stomach, or it would have been soiled and its bright colors faded thereby; it had not even been wetted, or its thin delicate

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wings would have been wrinkled and matted together like a wet dishcloth. The insect was undoubtedly present in the sick room, and being probably attracted by the white glistening surface of the washbowl, it darted towards it and dropped into it so suddenly that it was not perceived until it had alighted.

This Red-lined Leaf-hopper is so rare and so seldom seen that these few facts in relation to its habits become the more valuable. As to the extent of territory which it inhabits we only know that Dr. Harris met with it in Eastern Massachusetts, and Mr. Say captured the specimen from which he described the species in Missouri, and appears never to have found it in Pennsylvania.

The Yellow-lined Leaf-Hopper is a rather common insect in New York and New England, and specimens sent me by correspondents show that its geographical range extends west to Kansas and south into Arkansas, and very probably it exceeds these limits. It occurs in a variety of situations, being met with in gardens, meadows and forests, nourishing itself on the juices of nearly all kinds of plants and trees without manifesting a preference for any particular species of vegetation, unless it be the dahlia, on which I every year detect a number of them and their young. In addition to this plant I have noted it as occurring upon asters and other cultivated plants, and on the leaves of oaks, walnuts, the beech, maple, birch, willow, and on the dogwood and some other shrubs.

The larvæ and pupæ precede the perfect insects in their appearance. They begin to be observed in June, and are met with in much the same variety of situations as the mature insects, which they resemble in form and also in their motions and habits, except that they are incapable of flying. The larva is like the pupa in most respects, but is smaller and more pale, even translucent and watery in some examples, and the bristle of its antennæ is longer than the body, tapering, and very slender towards its tip.

The PUPÆ are a fourth smaller than their parents and have the same flattened oval form. They are of a light bluish green color and are clothed above with short white hairs with a fringe of longer ones around the sides of the hind body. A pale stripe extends from the front of the head along the middle of the back to the end of the body; and the segments are margined with confluent spots of grass green and pale yellow. Beneath, the hind body shows a pale yellow stripe along each side. The legs are pale green, with the feet watery whitish. The bristle of the antennæ is brown and nearly as long as the body.

The YELLOW-LINED LEAF-HOPPER in its mature state varies in length from 0.35 to 0.45, the smallest individuals being males and the largest ones females. Its

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body is of a nearly regular oval form, but when the wing covers are fully closed it is more tapering posteriorly and more pointed at its tip than in front. It is strongly flattened, and more convex across the closed wing-covers than in front. The surface is smooth and slightly glossy. It is of a very pale green color, fading when long preserved to very pale dull yellowish, the underside being paler. The head is flat, semicircular in front, concave at the base, narrower than the thorax, more than twice as broad as long, with a slender impressed line in the middle. The ocelli are nearly as distant from each other as from the eyes. Six stripes of a pale yellow color extend longitudinally from the base to the anterior edge. These become faded and indistinct in most of the preserved specimens. The two middle stripes are parallel to each other and have the ocelli inserted in their outer sides. The outer stripes occupy the inner sides of the orbits of the eyes. The antennæ are pale yellow, their bristle brown and equalling the thorax in length. The *thorax* is nearly flat, its surface finely striated transversely, and occupied by eight parallel longitudinal stripes of pale yellow, which are sometimes as wide as the intervals between them, sometimes much narrower. The scutel has the six middle stripes of the thorax prolonged across it, the outer ones merely forming a triangular spot upon its outer angles. It is crossed by an arched suture slightly back of the middle, which has its ends turned abruptly backward. The *wing covers* are destitute of transverse veinlets except at their tips and in the middle one of the longitudinal cells.

The RED-LINED LEAF-HOPPER has the body shaped the same as in the foregoing species and 0.43 long in the female. This sex has the *head* red and more or less striped and spotted with yellowish white. A narrow triangular spot of this color is placed on the middle of the base, extending half the length of the head and ending in a very narrow acute point. A second spot is placed behind the ocellus, reaching from its orbit to the base, commonly with its outer anterior angle prolonged outward and forward in an oblique streak reaching half way to the outer edge forward of the eye; this spot being also sometimes extended forward, passing the inner side of the ocellus and reaching nearly to the anterior edge. A third spot is placed also on the base equidistant between the second spot and the eye. It is small and triangular, extending nearly to the outer end of the oblique streak. The face is sometimes pale yellow with the upper border red; at other times it is pale red more or less clouded with pale yellow. The antennæ are commonly red, their bristle black, long, slender, tapering, nearly half the length of the body. The *thorax* is yellowish white with the posterior half of its surface stained with red in the middle. It is finely striated transversely and is crossed lengthwise with eight bright rose red stripes which are commonly very distinct and narrower than the intervals between them, but varying in different specimens. The two middle stripes are the most regular and smooth, often slightly thicker at their anterior ends and nearer approached than they are towards the base. The second stripe is uneven and somewhat dislocated in its middle, ending abruptly without attaining the anterior edge, its forward part bent inward and almost touching the middle stripe and in one instance uniting with it. The two remaining stripes united at both their ends and sometimes through their whole length, the outer one broader and placed but slightly inside of the outer edge. The scutel has the impressed suture across its middle strongly curved and the ends not abruptly turned backward as they are in the males; its color is red, with a yellowish white stripe in the middle which ends at the curved suture, and on each side of this is a

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MALES OF RED-LINED LEAF-HOPPER DESCRIBED.

slender stripe of the same color, which is widened at its hind end and reaches the margin at the end of the curved suture; this stripe being often obliterated and only its posterior end remaining in form of a triangular marginal spot; on the hind part is a curved transverse yellowish line, its ends joining those of the curved suture, and with it inclosing a transverse red spot of a regular oval form, the surface of which is finely striated transversely. The *wing covers* are salt-white, with the veins and veinlets red, and a red stripe on the outer border extending two-thirds of the length, edged with a white line upon its outer side. The wings are salt white with very fine slender red veins. On the *underside* the abdomen is pale yellow, sometimes having stains of red along the sides. The ovipositor or egg tube is brown and at its tip black. The legs are pale red, the hind pair long and slender with their thighs pale yellow.

The *males* of this Red-lined Leaf-hopper are smaller than their mates, measuring only 0.35 in length, and, as the reader is aware from what has already been stated, they differ remarkably from the other sex in color, being of a greenish instead of a rosy red hue, with the stripes of the thorax and the veins of the wing covers deeper green or olive, only the base of the thorax and the inner edge of the wing covers being colored as they are in the female.

The ground color of the males corresponds with that of the other sex, they being very pale green or greenish gray, above and beneath. The head has the yellow stripes wholly obliterated, except the basal ends of the two middle ones. The eyes and ocelli are frequently of a vivid crimson color in the living insect. The thorax has a large spot on its basal half as in the female, but of a different color, it being ochrey yellow or sometimes pale gray. This spot varies greatly in size, sometimes extending to the middle of the thorax, and sometimes but half this distance, and embraces the ends of four and sometimes six of the longitudinal stripes. And where these stripes pass upon this spot they lose their yellow color and become red as in the female, but of a deeper tint of crimson than they are in that sex. Forward of this spot and upon each side of it these stripes totally disappear, except the two middle ones, which are very faint watery green in the living insect and dull olive in preserved specimens. The scutel has two red spots on its base, at the ends of the two middle stripes of the thorax. Its outer angles are opposite the end of the third stripe, and a triangular spot commonly occupies these angles, which spot is red when the end of the third stripe is red, but when the ends of only four of the thoracic stripes are red this spot is of a dull ochrey yellow color. In one of the specimens before me this spot is larger, occupying all that portion of the scutel which is back of the end of the second stripe of the thorax. In another specimen it is small, and in the third example before me these spots and the two between them are wanting. The wing covers vary in the extent of the red color on their inner margins. In one instance only a narrow space adjoining the scutel is faintly tinged with red, and at the tip the slender marginal vein and the veinlets which join it are deep crimson. In the two other instances now under my eye the tips and a broad stripe extending the whole length of the inner margin is gray with the veins and veinlets in this stripe bright red. The remaining veins and veinlets and a stripe along the outer margin are olive.

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LEAF-HOPPERS. REMEDIES. FLOWERY PRIMROSE-MOTH. ITS NAME.

Upon our choice flowering plants we can illy brook these insects even in limited numbers, knowing that each one of them is daily wounding and bleeding the leaves and thus robbing the plants of some of their vigor and thriftiness. They are most easily captured and killed when they are young and unable to escape from us by flight. Therefore, any cultivated plant on which we frequently see these leaf-hoppers should be inspected about the middle of June, to ascertain if a brood of young insects is growing up on it, and if they are found to be present the whole plant should carefully be looked over and every young hopper that is seen should be picked off and destroyed. The vigorous growth of the plant will be much promoted by thus relieving it from these parasites which are living at its expense.

FLOWERY PRIMROSE-MOTH, *Alaria florida*, Guenèe. (Lepidoptera, Noctuidæ.)

Eating a hole in the flower buds of the Evening Primrose (*Œnothera*), and thus cutting the petals asunder; a pale green 16-footed worm with three deeper green stripes, and on top of its neck two dull cherry red spots; its pupa state passed under ground; the next year, in July, producing a light yellow moth with bright rose red fore wings, having a broad light yellow hind border, its width 1.25.

A rare and most beautiful moth, found by Mr. Edward Doubleday in his collecting tour through our State in the year 1837, was in 1852 figured and described by M. Guenec, in the *Suites a Buffon, Lepidopteres*, vol. vi, p. 171. He found it to be intimately related to another elegant moth somewhat smaller in size, which had long been known to the world from the fine figure of it contained in Smith and Abbott's *Lepidopterous Insects of Georgia*, where it received the name *Phalœna* (*Noctua*) *Gaurœ*, this name being given it from the plant on which its larva feeds, the *Gaura biennis*, the stalks of which are represented as being sometimes stripped bare of their leaves by this larva. These two moths are so similar to each other, and so different from the other species nearest related to them, that M. Guenée associates them together in a new genus, which he names *Rhodophora*, i. e., rose-bearing or having a rose color, and he terms our New York species the *Rhodophora florida*, the flowery or elegant rose-bearer. M. Guenée was evidently unaware of the fact that the Georgia insect had already been made the type of a new genus, named *Alaria* by Mr. Westwood, from whose manuscripts this name was published in 1841, by Mr.

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Duncan, in editing the volume on Exotic Moths in Jardine's Naturalist's Library (Entomological series, vol. vii, p. 200.) This name, which appears to have been also suggested by the wings being so prettily colored, having been first published, seems entitled to stand as the designation of the genus. *Alaria florida* will thus be the correct scientific name of our New York insect.

Upon my becoming acquainted with this moth through the figure and description of M. Guenée, I was much surprised that I had never met with a specimen of it. It was not till the summer of 1858 that I first saw it in nature, an individual being then brought me by Wallace Freeman, jr., from Adams, Mass., where it had entered an open window in the evening, attracted by the light of the lamp. Four years later, a specimen in like manner entered my own dwelling, flying rapidly and wildly around the lamp for a half minute, and frequently striking against the table, until falling upon a spot where it was shaded from the dazzling glare of the light, it there rested quietly until I obtained the implements for securing it. Finally, a flowering plant which I have recently introduced into my garden has been invaded by a worm which I discover to be the larva of this lovely moth. A brood of these larvæ has appeared upon this plant each of the two seasons it has now (1867) been blooming in my grounds, furnishing me with specimens of the moth, and enabling me to trace its history and transformations. From these facts it appears that though this insect is so rare that a collector may not meet with it once in a lifetime, if circumstances come to favor it, it may suddenly become common, temporarily, in particular localities.

The Evening Primrose, *Œnothera biennis*, which florists by cultivation have improved into such a large and very splendid flower, is liable to have its petals amputated when they are upon the point of expanding from the full grown buds, and all the beauty of its flowers hereby destroyed, by a green sixteen-footed worm, which is readily known by a peculiar mark, it having two dull cherry red spots or blotches upon the top of its neck.

In that magnificent variety of the Œnothera, the *grandiflora Lamarkiana* of our florists' catalogues, the stalk sends out a number of lateral branches, each bearing a long raceme of flowers at its end, the raceme elongating and continuing to grow a succession of flowers from July to the end of the season. Thrifty plants usually grow in a regular pyramidal form to a height of four or five feet,

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and each of the branches puts forth about four new flowers daily, arraying the plant in such a mass of bloom as renders it an ornament of stately splendor. These worms occur evenly distributed, one upon each branch, the flower buds growing thereon each day, supplying them with the exact amount of sustenance which they require. Thus each bud as they mature from day to day is visited in its turn. When it first begins to attract notice the worm is about half the length of the elongated bud, up which it crawls from the stalk, till the whole of its body is standing upon the bud, thus bringing its head about opposite the middle of the bud. It then commences gnawing into the bud, boring a round hole therein of sufficient size to admit its head, which it sinks downward, farther and farther, eating through the folded mass of petals, nearly or quite cutting them asunder, and severing also the stamens and pistil. Thus when the flower comes to burst forth from its bud at the close of the day, it is but half its normal size, and presents a most rueful aspect with the outer ends of its petals gnawed and ragged, and all the beauty of their natural appearance destroyed. The worm having finished its meal withdraws its neck and head from the hole and moves a short distance downwards, and there stands motionless for a time, for its food to digest, its body being so similar in size and color to the long tube forming the base of the flower bud that it is liable to escape observation unless the search for it is sharp. When it has rested awhile it crawls farther downward till it comes to the branch, or till it can reach the next bud of the branch, up which it mounts and makes another meal. One bud would amply suffice for its nourishment twenty-four hours if it would continue to feed upon it till it had wholly consumed the petals and stamens, which are rolled compactly together within it. But instead of this it adopts the most destructive course it can pursue, forsaking the bud as soon as it has perforated it sufficiently to cut its petals asunder. Being so needlessly wasteful in its propensities we feel less compunction in destroying it than we otherwise should, knowing what a beautiful thing it finally becomes.

Sometimes the mutilation is less complete, either from the worm being smaller in size or interrupted in its operations. And the flower thus comes to present, usually, a very curious appearance. The worm eating through the four petals when they are closely folded together, when they come to expand each is commonly cut in the same manner; a large roundish hole, it may be, is taken

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out of the centre of each petal, the holes all being of the same size and shape, the work appearing at first glance to have been done artificially and in a most dextrous manner.

The LARVA is cylindrical, tapering slightly at each end, and grows to one inch in length, when crawling elongating itself to 1.15, and is 0.18 thick. It is clothed with fine, shortish, scattered hairs which are placed symmetrically. Its ground color is pale green, of a yellowish or apple green tint when full grown, but usually pea green when it is smaller. Along the middle of its back is a stripe of a deeper grass green color, and a similar one upon each side of the back. These three stripes extend from the neck to the middle of the penultimate segment. Each of the lateral stripes has a dull cherry red spot at its anterior end, placed on each side of the middle of the neck or first ring, and in rare instances the anterior ends of these lateral stripes are of this color for a short distance. Before it is fully grown the lateral stripes are sometimes faint or wholly wanting; and low down on each side is an elevated fold of the skin which forms a faint stripe of a paler color than the ground. The head is a third narrower than the neck and is held obliquely downward and forward. It is slightly paler than the body and is clothed with fine erect hairs.

A variety of the larva occurs, of a dull pale brownish yellow color, with the stripes olive or dull brownish green. In one instance a young larva 0.60 long was observed wholly destitute of the red spots upon the neck.

These worms exhale a disagreeable odor, which is particularly strong and offensive when several are placed together in a closed box. When they are thus confined they soon become wet with perspiration, and die in one or two hours. They are slow in their motions and are very unsocial and intolerant of each other. If one meets another they act very cross and spiteful, and turn away to avoid each others' vicinity. They live solitary, each one remaining upon his own raceme of flowers and travelling only the few steps from one flower bud to the next. And if the branch is cut off and inserted in a flower pot of earth the worm persistently remains upon it, even after it has ceased to flower, and refuses to forsake it until the cravings of hunger oblige him to wander away and seek sustenance elsewhere. He then spins a silken thread from his mouth, perhaps as a clue to guide him back to his own branch again should he be unsuccessful in finding a new residence; for he does not appear to spin this thread ordinarily in passing from one flower bud to another, nor does he usually suspend himself by a thread when knocked or falling from the place where he is standing. One of these worms which I placed in a glass jar in which was a young bug which I was rearing—one of the Reduvius group, which subsists upon and destroys other insects and their larvæ—

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was not immediately attacked by the bug, it having been recently fed. The worm thereupon with its threads wove a close web over itself in a corner of the jar, whereby the next day the bug was unable to get at it to devour it.

It was the middle of September when I first discovered these worms, they being then grown to three-fourths of an inch in length. The next year they made their advent in full force nearly two months earlier. Thus they are liable to be present among the flower beds at all times from the middle of July till the end of September—the parent moths not coming forth simultaneously to deposit their eggs, but appearing one after another, for a period of at least six weeks, in July and the fore part of August, whereby it comes to pass that small young worms and those that are grown to their full size are seen upon the plants at the same time.

When the worm is done feeding it crawls down the stalk to the ground and there buries itself to pass its pupa state, underneath the plant on which it has been fed. Thus the whole distance which it customarily travels, from the time it hatches from the egg until it enters its pupa state scarcely exceeds four or six feet. The instinct to bury itself immediately upon its coming to the ground is so strong that its only care seems to be to avoid encroaching upon the places of sepulture of others that have preceded it in descending from the same plant. Upon reaching an unoccupied spot it hastens to inter itself. Even if it chances to be upon one of the hard trodden walks of the garden, it does not go further, to seek for a softer spot, but at great labor bores a cylindrical hole of sufficient size to admit its body, directly downwards, where the earth is so firmly compacted that we would suppose it quite impossible for a soft worm like this to penetrate it.

It remains underground through the autumn, winter and spring, coming out in its perfect form the following summer. As already intimated, the first moths begin to be seen abroad at the commencement of July, and others continue to come forth till the middle of August. These moths may be met with during the day time, resting openly exposed among the wilted flowers of the Œnothera. Although they are classed with a group of moths that are day-fliers, I have never seen one of them take wing by day. They appear to fly but little. It is probable that the narrowness of their wings incapacitates them from flying so readily and freely as do their kindred. A moth which was standing upon a flower stalk of the

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primrose, upon my attempting to impale it dropped itself to the ground without so much as opening its wings to fly, and merely sought to crawl under some covert there for concealment, freely mounting upon my hand when placed in its way, and appearing very dull in its motions and as though it were drowsy and stupefied under the influenc of some narcotic.

The two sexes are remarkably alike in size, in color and in the structure of their antennæ. The only particular in which they perceptibly differ is in the termination of the body, which in the female tapers to a simple point whilst in the male it is furnished with large flattened valves which are fringed and densely coated over with hairs. The female probably drops her eggs singly here and there upon the flower buds of the primrose.

This MOTH has a slender body, the dried specimens both of the male and female most commonly measuring 0.60 in length, and 1.30 in width across the extended wings. The *head* is bluntly rounded in front and is smoothly clad with hairy scales which are usually white, but in some examples pale red. The antennæ when turned backwards surpass the thorax in length, and are thread-like, being scarcely thicker towards their bases than at their tips. In both sexes very short minute hairs project along their undersides. They are of a white color with the underside pale orange. The palpi or feelers project horizontally forward, their tips slightly surpassing the front. They are covered with rose red hairs which are smoothly pressed upon the surface, with the very small apical joint visibly protruding at their tips. The spiral tongue about equals the antennæ in length and slightly surpasses them in thickness towards its base when viewed in front. The *thorax* is densely covered with white hairs, their ends forming an even, smooth surface. The collar is usually of a delicate rose red color, but in some specimens white. The fore breast is bright rose red. The *abdomen* is rather slender, conical, projecting farther back than the extended hind wings, and in the males ends in large flattened valves which are fringed and densely coated over with straw-colored hairs. Its surface is smoothly covered with short white scales, those on the hind edges of the segments being straw yellow. The underside is pale red, except at the tip. The *legs* are rose red and on their underside white, the thighs having each a tuft of long white hairs underneath. The anterior shanks are short with a strong brown claw at their tips and two or three spines above, in a row with it, and on the opposite side a row of several brown spines. The middle and hind shanks are rather long and slender, with a pair of long spurs at their tips, and the hind ones with a second pair placed above those at the tip. The fore *wings* are narrow, being 0.58 long and but half as broad in their widest part. They are straight on their outer or costal side, rounded at their tips, their hind edge from thence straight to the middle, where it is slightly rounded and again becomes straight till it approaches the inner angle, the inner edge being also straight two-thirds of its length. These wings are of a delicate bright rose red color, with the axilla white, and the hind border pale bright yellow, this last color varying in its width, in different specimens occupying from a third to less than a fourth of the

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wing. The red portion is slightly wavy on its hind edge, usually having two round notches, the outer one a little outside of the middle and distant from the outer side of the wing, the other more than half way from this to the inner side. And commonly upon this red portion faint clouds of a paler color are perceptible, but vague and indefinite. Frequently, however, a very faint, grayish band may be discerned, extending from the middle of the inner side obliquely across the wing, parallel with and a little forward of the hind edge of the red portion. And in some specimens this grayish band is perfectly distinct, and forward of it the central portion of the wing between the two principal veins (the intercostal area) is of the same grayish color, and in this paler space appears a small round spot, and back of it upon the anterior edge of the grayish band a squarish transverse spot, of the same rose red color as the ground, their edges indefinite, these spots appearing to represent the two stigmas common to the wings of this family of moths. The hind wings are white tinged with yellow. The underside of both pairs is pale yellowish with the outer sides pale rose red.

When an insect of such beauty as is this moth appears in the grounds around our dwellings, rivalling in the delicacy and elegance of its colors the finest flowers which we cultivate, remaining at rest where it is openly exposed during the day as if to invite us to approach and inspect and admire it, the question arises whether we shall war upon and destroy it, or allow it to remain undisturbed as being an ornament which will interest and delight every one who beholds it. If unmolested it will probably continue for some years wherever it makes its appearance, until an uncongenial season arrives or parasites multiply to destroy and suppress it. But to have one of our finest flowers every year mutilated and divested of all their beauty by the broods of ugly looking worms which these moths produce is scarcely to be endured, even though these worms are so similar to the flower-buds on which they stand as to be unobserved except upon a close inspection. When I first discovered these worms and became aware of the pernicious work in which they were engaged, I waged a war of extermination upon them—with pincers detaching from the plants every one I could find, dropping it to the ground in the hard beaten path and drawing the sole of my boot over it. With my closest scrutiny several worms were overlooked, and were searched out and destroyed upon the following days. But when I came to know that these worms would grow into these elegant moths, they found more favor in my sight. I then allowed a number of them to get their growth and leave the plants before I began to search for and destroy them. It was in my mind to check this moth from becoming greatly multiplied, but to cherish and preserve it in moderate numbers in the

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grounds around me; and I had it in view to grow one or two plants of the evening primrose in some obscure corner of my garden for the exclusive accommodation of these worms, and remove to them or destroy the worms that came upon the plants in other parts of the grounds. But as these pages are going to the press (1868) I am able to state that the insect has this year entirely disappeared, although quite a number of the larvæ interred themselves the previous season. Whether it was aware that a large portion of its numbers was being destroyed and that the situation was therefore an unsafe one for it to remain in, or whether the unusual severity of the last winter's cold or some other atmospherical change has caused it to perish, I am unable to say. And whether it will be possible for us to keep these beautiful moths about our gardens and yards in such moderate numbers as not to be a nuisance to us remains to be ascertained.

For several years a specimen of a third species pertaining to this interesting and lovely genus, has been in my cabinet, vieing in the richness of its colors with the two species already known. It was captured in the Indian Territory west of Arkansas by my valued friend William S. Robertson. It measures one inch in width across its extended wings, and is of a bright ochre yellow color, with its fore wings deep crimson and crossed by two curved and zigzag white lines.

The anterior white line or band crosses the fore wings slightly forward of their middle, and to the eye resembles a figure 3 rudely marked upon the wing, it being composed of successive curves and angular points jutting forward upon each of the three principal longitudinal veins. It is slender, ragged and uneven through most of its course, but is widened abruptly at the outer fourth of its length, where it is also stained with tarnished yellow, and continues broad from this point to the outer margin. The posterior band begins on the inner margin near its hind end, and at a third of its length approaches quite near the anterior band. It then turns toward the tip of the wing, this middle portion being a slender, smooth, zigzag line, jutting backward in a row of very slender and acute angular points upon the veins, to the number of five or six. Finally, towards its outer end it bends more forward and attains the outer margin at right angles with it, ending thereon half way between the outer end of the anterior band and the tip. Between this band and the hind edge is a sprinkling of white scales forming a faint cloud-like subterminal band. The hind wings are white, their outer posterior half pale red, as is also the fringe. The underside of both pairs is dull sombre crimson with only a small portion of the base and inner side whitish. The abdomen is leaden gray on the back and pale red on the sides and beneath.

The rich lively color of the wings of this moth, appearing as though they were deeply dyed in the ruby wine, brings to mind as

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its namesake the goddess of pleasure, represented as a beautiful young woman elegantly dressed and adorned. I have therefore termed it the *Alaria Volupia.*

OHIO CURRANT SAW-FLY, *Pristophora rufipes?* St. Fargeau. (Hymenoptera, Tenthredinidæ.)

Eating the leaves of the currant and the gooseberry in July, clusters of small, cylindrical, pea-green worms with blackish heads; growing to three-eighths of an inch in length, and then entering the ground and enclosing themselves in cocoons the size and shape of kernels of wheat, and producing a black, four-winged fly with light brown legs.

This insect made its appearance in such numbers as to attract notice about ten years since, in the vicinity of Cleveland, Ohio. Our knowledge of it is obtained from a very intelligent account, published in the *Ohio Farmer* of July 24th, 1858 (vol. vii, p. 233), from the pen, we suppose, of Dr. J. P. Kirtland. It was about five years previous to that date, that the writer says he first became aware of the presence of this new enemy, from noticing particular places among the currant bushes, where the leaves had been much eaten, evidently by broods of worms, although none of the worms could then be found, they having, no doubt, completed their growth and gone into the ground to repose during their pupa state. And it was not until the year then current that he had succeeded in finding these worms at their work upon the leaves, whereby he had enjoyed a good opportunity to watch their transformations and obtain a satisfactory knowledge of their history.

The worms are described as being of a pea-green color, with the head brownish black. The segments of the body are slightly wrinkled, and along each side is a row of protuberances, or warts, of the same color as the body. Like the larvæ of most of the saw-flies they have twenty feet, six being placed upon the breast or underside of the three first rings, twelve upon the abdominal segments, and two at the tip or hind end of the body.

These worms live together in clusters and eat the leaves, commencing at the edge and devouring all except the coarse veins. As they move about they spin a very light web from leaf to leaf. When young they are difficult to perceive, being so small in size. They often take shelter in the axils of the leaves, and will also drop themselves to the ground when disturbed, spinning a fine thread of silk as they descend, in the same manner as the measure

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worms. They feed upon the leaves of the cultivated gooseberries as well as those of the red currant, and seemed to be most fond of Houghton's seedling gooseberry, from the small plants of which they had entirely stripped the leaves.

How long these worms are engaged in feeding and obtaining their growth is not stated. They are about three-eighths of an inch in length when fully grown, and the head is then lighter colored than when younger. They then forsake the bushes and crawl into the ground, where they enclose themselves in brown oval cocoons, which are about the size and shape of kernels of wheat. They remain in these cocoons only about a week, in the summer season, but the last or autumnal brood lies in the ground in its pupa state through the winter. In coming out, the insect bursts or gnaws off the end of the cocoon, and leaves it lying in the form of a lid.

In its perfect state it is described as being 0.20 in length and 0.42 in width across its extended wings. The head, thorax and abdomen are black, and the legs light brown. The wings are hyaline, with the stigma and veins brownish. The surface of the wings is covered with minute hairs standing erect at a considerable distance apart.

In size and the color of its body and limbs, it appears to be identical with the European *Pristophora rufipes* of St. Fargeau, but the information which is furnished us is too limited to enable us to decisively pronounce the two insects to be the same.

The writer says that air-slacked lime sprinkled over the leaves will destroy these worms, as will also a mixture of whale oil soap and water. Tobacco water also has the same effect. But all these remedies require to be thoroughly applied. Hellebore powder, as mentioned under the next species, will doubtless be the most efficacious and economical remedy for this species also.

CURRANT-WORM and SAW-FLY, *Nematus trimaculatus*, St. Fargeau. (Hymenoptera, Tenthredinidæ.)

Stripping bare of their leaves the currant and gooseberry bushes throughout the season, but most numerous in June and in August; flocks of pale green twenty-footed worms with numerous black dots, a black head, and the neck and last ring of the body yellow, three-fourths of an inch long; passing its pupa state underground and producing a yellow four-winged fly having three large black spots on its thorax often united into one.

An insect which of all others is most interesting to the inhabi-

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tants of a large portion of the State at the present time is the new worm upon the currant bushes. Introduced upon this side of the Atlantic about twelve years ago, it has been multiplying and extending itself over the country in all directions, and within two or three years past has arrived in numerous localities in the northern, eastern and southern sections of the State, showing itself such a formidable destroyer as to attract much public attention, and every item of information relating to its past history, its habits and remedies is sought for with avidity.

This currant worm has been known many years to European gardeners and men of science, as being the very worst of all the enemies by which the gooseberry and currant are attacked. It would appear to have made its advent there at a recent date. So multiplied and destructive as it has been in Europe in our day, it is remarkable that it was wholly unknown there a century ago. It was not till the year 1823 that it was first noticed and described, by a French entomologist, Count Le Pelletier de Saint Fargeau, in his treatise upon the saw-flies (*Monographia Tenthredinum*, page 69,) who named it the Three-spotted Saw-fly, *Nematus trimaculatus*, in allusion to the three black spots on its thorax. *Nematus Ribesii*, *Tenthredo Grossulariæ*, and *Tenthredo ventricosa* are also names which have been given it by different writers. The gooseberry is much more largely and the currant much less cultivated in Europe than in this country, and consequently this insect in Great Britain is popularly named the gooseberry saw-fly, and its larva, which, wherever it is known in our country is called the currant worm is there termed the gooseberry caterpillar.

For several years, about twenty-five and thirty years ago, this insect became multiplied to an unusual extent and was very destructive, at least in England, and was much noticed in the Horticultural and Scientific publications of those days. In the year 1841 its ravages appear to have been most severe, transcending everything that had been previously experienced. In the *Gardener's Chronicle* of that year, page 597, C. Lawrence says, "I never recollect any season in which this pest made such determined and repeated attacks upon the gooseberry and currant trees. I have always found hand-picking the only sure mode of arresting their progress, but this season that was unavailing; for after employing many persons to pick off and destroy the caterpillars and looking over the trees to see that the work was effectually done, in the course

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AN EFFECTUAL REMEDY CALLED FOR. HELLEBORE MOST EFFICACIOUS.

of a week I found the grubs as thick as ever. I had the picking repeated, with the same result. I could not think whence they came, knowing they did not come, as my old gardener would have it, from the blighty air. On examining the leaves carefully from the edge of which the mature caterpillar had been picked, I observed a numerous progeny, on the under surface, of very minute caterpillars, hardly visible from being exactly the color of the leaf. I then had every leaf picked, on which a caterpillar was found, into a basket and burned them, and suffered no further inconvenience. I therefore recommend to pick and destroy every leaf on which a caterpillar is found." Mr. L. seems to suppose the minute young worms were the progeny of the mature worms which had been picked from the leaves and destroyed—an idea almost as crude as that of his ancient gardener, who supposed they were generated by "the blighty air."

An anonymous correspondent (page 501) says his gooseberries in the spring were much infested with the caterpillars. He tried various ways to destroy them. Fresh slacked lime throwed over the trees had no effect whatever, and to see if quicklime would kill them or not, he covered some of them with it, but they soon were seen creeping out of the lime and making their escape. At last he had recourse to hand-picking, and by perseverance destroyed all the caterpillars in his small garden, and thought he had thus done with them, for this year at least. But he had that morning discovered to his surprise that his trees were again covered with the destructive things, and that the leaves were also lined with eggs, the same as in the spring. He says, "Various remedies have been proposed for their destruction, none of which, I think, are effectual, except hand-picking, which in large gardens would be a tedious operation, and my object is, to induce some of your more experienced correspondents to attend to this subject, and find out, if possible, some ready mode of destroying the caterpillar, or of otherwise preserving the trees from its destructive ravages." To this the editors of the *Chronicle* add—"We most sincerely desire to hear of some *effectual* remedy for this pest."

This call brought a number of responses, certifying to the efficacy of White Hellebore (*Veratrum album*). H. Groom (page 533) directs to make a strong decoction of the root, adding a handful of green tops of elder, and syringe the bushes with this when cold. He supposes the decoction drying on the leaves poisons the cater-

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pillars. R. Lymburn states that he has for some years used hellebore and found it very effectual. In his district it is quite generally used. He says, he some years ago had a valuable lot of plants which were like to be altogether destroyed. He kept a man picking off the caterpillars eight days, with great expense and little execution. He had tried quicklime, potash and soda without effect; and tobacco juice is apt to kill the foliage. He then tried hellebore, and a half pound of the powder completely cured all his bushes. A man held up the branches to expose the underside of the leaves, whilst he dusted them with the forefinger and thumb, wherever a caterpillar was to be seen. The powder must be dry, and if it is not it should be toasted before the fire. It disperses into a cloud, and wherever a particle reaches a caterpillar it collapses as if stabbed, and in an hour or two nothing but the skin is left. Some dust it up from below with a puff, sending it upon all the bushes, which is less trouble but a waste of the powder. Some dust it from above with a dredge box, but it does not reach the caterpillars so readily in this way. A great many prefer an infusion of the powder in water, which is said to be very efficient. Disappointments have arisen from the powder having lost its pungency by being long kept and damp, which may be known by its making only a faint impression on the nostrils. It will then do no good.

The editors thank several others for communications to the same effect. The following year other attestations of the value of this remedy appear, and the editors say (page 381), "There is no longer any doubt respecting the efficacy of genuine hellebore powder in destroying this pest."

In 1841 also appears in the *Gardener's Chronicle*, page 548, a most valuable paper upon this Gooseberry and Currant Saw-fly from the able pen of Mr. Curtis, it forming No. 14 of the "Ruricola" series of Entomological articles which he communicated to the public through that periodical. It is accompanied with an excellent wood cut illustration showing the eggs along the veins of the leaves, the larva feeding, the cocoon, and the fly magnified. And we cannot do the reader a better service than to here extract a portion of this important paper.

Mr. Curtis introduces the subject by observing that "Most of the Hymenoptera or Flies with four transparent wings are beneficial to man, the immense family of Ichneumons, the minute Dipl-

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lepidæ, and the powerful Sand-wasps being all parasitical animals, which by depositing their eggs in the bodies or upon the skins of the larvæ of noxious insects, keep them within certain limits; otherwise it is doubtful whether any crop would reward our toils. Such, however, is not the character of the Saw-flies, or Tenthredos as they are termed by Linnæus; for there are few insects that prove more fatal, when favored by congenial seasons. It is only a few years since whole districts of turnips were completely consumed by Athalia spinarum. Our beautiful Rose-trees are subject to the attacks of five different species, and amongst them Hylotoma Rosæ which skeletonizes the leaves; then our Plum, Cherry and Pear trees have the upper cuticle and parenchyma so completely rubbed off by the shiny, slug-like larvæ of Tenthredo Cerasi, that the crops, especially of Pears, are often materially injured. Our Raspberry bushes also are subject to the invasion of another species; and the extensive devastations of the Gooseberry Saw-fly are fresh in the memory of every cultivator."

After describing the fly, he says, "The flies emerge unheeded from their tombs the beginning of April, and the female soon deposits her eggs close to the sides of the principal nervures on the underside of the leaves, which is very remarkable, for all the females of this extensive family are furnished with an instrument called the saw, for the purpose of cutting into the leaves and stalks, and introducing the eggs between the cuticles or under the bark." Although it may be "very remarkable" that these flies do not employ their saws for sinking their eggs into the texture of the leaves, it is by no means unusual, our Rose Saw-fly and several other species merely dropping or very slightly gluing their eggs to the surface of the leaves.

"In about a week the larvæ hatch, and commence feeding on the leaves on which they are stationed, and soon riddle them full of small holes; thus they go on, feeding and changing their successive skins as they increase in size, until they are three-fourths of an inch long, when they are seen scattered around the edges of a partly demolished leaf, holding by their fore legs, with their tails turned up, or lying on one side.

"There seems to be a succession of broods, from the early spring until October occasionally; but the greatest numbers are congregated in May and the beginning of June, when, I understand they have caused twenty to thirty pounds of damage in a market

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garden near London in one season; but in the neighborhood of Blandford last year, the second attack of the Gooseberry bushes in July and August was, if possible, more devastating than the first. Having defoliated a bush, leaving nothing of the foliage excepting the footstalk and sometimes a portion of the main rib, and being arrived at maturity, they cast their skins again and then lose all their black spots, becoming of a uniform pale green with two little black dots on the head, the spaces behind it and towards the tail retaining the yellow tint. After resting awhile they descend into the earth, and spin a yellow-brown cocoon, formed of silk and gluten of so thick a texture that it is impervious. From these the summer broods of flies come up in less than three weeks, but the autumnal ones remain in them, curled up in the larva state, until the following spring, when they change to pupæ, in time to produce flies as the currant and gooseberry trees are coming into leaf.

"There are two modes of proceeding to rid our gardens of this terrible scourge: to catch the flies, or search for the eggs and cut off the infested leaves, is scarcely practicable; our plan is, therefore, to look for the caterpillars; for small as they are at first, they are easily detected by the perforated leaves; and when half grown they are visible enough, and after that period they commit the greatest havoc, having inordinate appetites, and scarcely ceasing from their gluttony except when their jackets become so tight that they are obliged to change. Hand-picking is, therefore, attended with great success in small gardens, but in plantations it is easier to sprinkle strong lime-water, as it is termed, over the leaves, which will destroy the caterpillar; or syringe the bushes well, and then dust them with quick lime, having previously laid a good quantity round the stem to prevent their re-ascending the bush; it is said also that water heated to 140° Fahrenheit, and thrown forcibly upon the bushes, through the rose of an engine or watering-pot, will kill the larvæ, without injuring the tenderest leaves on the bushes. The other method alluded to is, to destroy the pupæ; and this seems to be best effected by scraping away the earth from the roots early in the spring, and drawing it into a deep trench between the bushes, covering it over and tramping it well down. If boiling hot water be used, either in autumn or spring, to kill the pupæ, it should be put upon the earth when it is quite dry; the soil must be lifted two inches, and returned as soon as the

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HOW INTRODUCED INTO THIS COUNTRY. FIRST SEEN IN CANADA?

water is poured in, that as the heat passes off it may destroy the animals encased in their shells."

Mr. Curtis evidently had not noticed the then recently published statements of the efficacy of white hellebore as a remedy for this pest, or he would not have failed to allude to it.

For many years past we meet with no allusions to this saw-fly in the foreign periodicals, whence we infer it has so far ceased its ravages that it no longer attracts public notice.

We now come to the advent of this formidable scourge in our own country. As the worm goes into the ground early in autumn to lie dormant in its cocoon through the winter, it was undoubtedly in this state that it was brought across the Atlantic. Some European gardener in transmitting, probably, some choice foreign variety of the gooseberry to some one of the Rochester nurserymen, we suppose, took up roots which chanced to have some of these cocoons lying in the balls of earth around them—he being little aware of the calamity he was thereby inflicting upon us and upon our country through all coming time.

According to the published accounts these worms were seen on the currant bushes around Rochester, certainly in the year 1857, and perhaps one or two years earlier. We have indications, however, that these worms were on the currant bushes in Canada West previous to their appearance in the vicinity of Rochester. In the *Genesee Farmer* of February 1857 (vol. 18, p. 67) is the following communication: "I would beg to call your attention to a green worm, which proves very destructive to our currant bushes in this section. It makes its appearance early in June. In the first place it is very small; it eats the leaves, and in about a month the bushes are completely stripped of their leaves, at which time the worms are about an inch in length. If you or any of your readers, would be so kind as to inform us how to prevent the ravages of this destructive little worm, you would no doubt confer a great favor on many of your readers in this community.—D. C. Houseberger.—Rainham Center, C. W." From the few points here given us—a green worm, appearing early in June, and in a month stripping the currant bushes bare of their leaves, and growing to about an inch in length—it would seem that the worm referred to could be no other than this which we have under consideration, and that this worm therefore was defoliating the currant bushes some sixty miles west of Buffalo in the year 1856, and perhaps earlier. The

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editor states that there is no such enemy upon the currant bushes in the vicinity of Rochester, and that the description given of the appearance and habits of this worm is so general that we are unable to definitely decide what it is. He suggests that it may be the larva of the saw-fly so destructive to the gooseberry and currant in some parts of Great Britain, which might readily reach this country with the large quantities of these plants which are annually imported; and he presents Louden's description of this insect, desiring his correspondent to study closely the habits of this enemy and communicate the result of his investigations. But we meet with nothing subsequently published to give us more light respecting this Canada worm.

The first notice referring explicitly to this worm as an inhabitant of our country, we believe, appeared in the *Rural New Yorker* of July 24, 1858 (vol. ix, p. 239). To show that it was a new enemy, quite different from the yellow measure worm, the larva of the American Currant Moth, a description and illustrations of the latter were given in the issue of the preceding week, stated to be derived from our paper upon this moth, which appeared in the *Transactions of the State Agricultural Society* for the year 1849. A cut, figuring the worms, the cocoon and the fly accompanies the description given of them. The first announcement in this country of this dreadful pest will be perused with interest, although it repeats some things which have already been stated. It is headed "The Gooseberry caterpillar," and reads as follows: "In our last we gave a description of the American Currant Moth, and now we present another enemy of our currant and gooseberry bushes, and one which proved the past season even more numerous and destructive than the former. How long since this insect was first seen in the country, or whether it is a native or an emigrant, we cannot say. But of the fact of its having taken almost entire possession of our currant bushes, and of its very close resemblance to the Gooseberry Saw-fly of Europe, there can be no doubt.

"The flies emerge from their winter quarters in the ground the latter part of April or early in May, and soon after the female begins to deposit her eggs on the underside of the newly expanded leaves, choosing the sides of the veins or nervures as a fitting place. With the saw-like appendage, for which the family is remarkable, the female commences cutting into the leaves, and in the opening deposits her egg. The larva is hatched in about a week, and com-

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FIRST PUBLISHED NOTICE AND DESCRIPTION OF IT.

mences feeding on the leaf, increasing in size and frequently changing its skin, till it is about three-quarters of an inch in length. It is now of a dull pale-green color, the first thoracic segment being deep yellow, the penultimate being also of the same color; the feet, tail and head are black, and each segment is dotted black also, some having as many as twenty-four spots arranged in lines down the back, while those on the sides are more irregular, with one large one at the base of each foot. They have six pectoral, sharp, horny feet; the fourth segment appears destitute of feet, but the six following are each furnished with a pair of legs, which assist them in walking; they have also a pair of feet at the extremity of the last segment.

"In the fly state it assumes an ochreous color; the body is orange, sometimes bright; the wings are iridescent, and, when expanded, are about two-thirds of an inch in length; the antennæ are almost as long as the body, bristly, brownish above, and nine-jointed; the crown of the head and eyes are black, as are also three large confluent spots in the centre of the trunk, and also a large patch on the breast or sternum.

"The broods of caterpillars appear in succession occasionally from March till October, but in greatest numbers in June. Sometimes they severely attack the gooseberry in July and August, and after denuding the bushes of their foliage, they descend into the earth, spinning themselves a yellowish cocoon of an elliptical form, and remain in their pupa state till the following spring. Those of the earlier summer brood descend in like manner but in the course of three weeks, or less, undergo their transformation, and again appear as perfect flies.

"Syringing the bushes, on the first appearance of the caterpillars, until the foliage is well wetted, and then dusting them all over with powdered caustic lime, is effective. The operation should be performed at least two or three times to secure their destruction, and the earlier it is done the better. Watering with lime-water has much the same effect, and covering the ground under the bushes with fresh tanner's bark is also advantageous. The most radical cure, however, is to remove the soil under the bushes to the depth of three inches, and to dig pits two feet deep and bury the soil in them, substituting that taken from the pits for that which has been removed. Water heated to 140 degrees and applied by the syringe or garden engine, has been found destruc-

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tive to the caterpillars, while the foliage has sustained no injury. The practice of striking the stem of the bush suddenly with a mallet, so as to cause the caterpillars to fall to the ground, where they may be bruised to death with the back of the spade or trodden under foot, is sometimes attended with much injury to the stem and bark of the tree. If the insects are not too numerous a good deal can be done by hand-picking."

Thus, on its first appearance, this worm was so plainly announced and shown to be a new and different species from the measure worm of the currant moth, that some of the correspondents of the agricultural periodicals are scarcely excusable for having afterwards confounded them together.

The next notice of this insect appeared in the same newspaper, May 28th of the following year, saying "It is only two years since our attention was first attracted to this insect. How long ago it was first seen in the country, we cannot say." And the description given the preceding year is repeated. This statement, with that of the *Genesee Farmer*—that there was no such insect in that vicinity in February 1857—strongly indicates the spring of 1857 as the time of its first appearance in Rochester.

The *Rural New Yorker* of August 4th, 1860 (vol. xi, p. 247), in a general article upon the currant, its varieties, mode of culture, &c., speaks as follows of this insect: "The currant is subject to no enemies or diseases of particular importance, except the *Currant Caterpillar*, which for four or five years past has caused great trouble and anxiety to the growers of this fruit, and a partial or total loss of the crop, and in some cases of the plants. This insect is supposed to be the same as that which is known in England as the grub of the *Gooseberry Saw-fly*. It is thought to have been imported from Europe with gooseberry plants. Rochester seems to be the centre of its operations, and in many places fifteen or twenty miles distant it is unknown. Mr. Hoag, of Lockport, stated at the last meeting of the Fruit Growers' Society, that he saw a few on his plants, for the first time, the present season. Their spread would no doubt be checked, if every one, on its first appearance, would make a diligent effort for this purpose; but where it becomes numerous it is, to say the least, very difficult to save the plants from destruction. They commence their ravages soon after the young leaves appear, and as a new brood of insects appear every two or three weeks, the cultivator generally becomes

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discouraged, and retires from the contest. In England they destroy, we believe, only the leaves of the gooseberry, but in this country, where gooseberries are scarce, they commence at the few gooseberries that may be within their reach, and then attack the currants, seldom leaving while a leaf remains. The black currants they do not relish." And a description follows, similar to what has been given above, of the fly, its larva, and the remedies for destroying them.

H. Hubbard, editor of the *Chenango Union*, informs the *Rural New Yorker* (vol. xii, p. 199) that in the spring of this year, 1860, he purchased several new varieties of gooseberry from a Rochester nursery, and planted them in his garden at Norwich, N. Y. They grew well, until one day in the month of June, to his astonishment he noticed they were nearly stripped of their leaves. On a closer examination he found the cause to be the Saw-fly worm, which he had never seen before, although he had always cultivated gooseberries. They before fall defoliated his old bushes also, every remedy which he tried being of no avail.

In the same periodical, June 8th, 1861 (vol. xii, p. 183), a Canandaigua subscriber states that large numbers of small, green worms, had lately appeared on his currant and gooseberry bushes, making great havoc with the foliage. The editor observes, that he has been fighting this same worm for several years, and with very little success. He is a foreigner, doubtless imported from Europe with currant or gooseberry plants, but is more at home here and thrives better than in his native land. He adds that it is no doubt the same as the Gooseberry Saw-fly of Europe. In another notice of this insect, a fortnight later, the editor states, "White hellebore, powdered and dusted on the leaves, or blown on with bellows, is recommended by English gardeners, and has proved successful here." It is reported, in a meeting of the Fruit Grower's Convention of Western New York, that Mr. Harris of the *Genesee Farmer*, first suggested hellebore as a remedy for this worm.—(*Country Gentleman*, vol. 25, p. 413.)

In 1862, a correspondent of the *Rural New Yorker*, at Erie, Pa., states (vol. xiii, p. 183), that the worm had been in that place one or two years. Dr. Sylvester, of Lyons, N. Y., says (p. 115), that he first saw the worm there in 1860. At Fulton, N. Y., C. S. Rust (*Country Gentleman*, vol. xxx, p. 94), reports that it appeared this year, completely destroying the foliage first of the gooseberry and

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then of the currant bushes. As we have no accounts of it elsewhere in that part of the State at this time, it was probably brought direct to Fulton in plants obtained from Rochester.

The editor of the *Rural New Yorker*, this year reports (p. 199), that he had uprooted and burned all his bushes, and now having planted a few new ones, they are growing thriftily, and the fly does not come near them, it having been starved out or emigrated to better quarters. H. H. Doolittle, however, says (vol. xv, p. 119), he finds that cuttings and one year old plants are not attacked, though when they become older than this they enjoy no such immunity.

When attending the State Fair this year, at Rochester, October 2d, I had a very interesting visit to the Mount Hope Nurseries of Messrs. Ellwanger & Barry, and inquiring with respect to this currant worm, was informed by Mr. Barry that it had this year appeared in their grounds for the first time. A numerous brood of the worms, in June, had totally defoliated the bushes at the single point which they occupied. They then disappeared until a short time before, when, what was evidently the progeny of the previous brood had spread themselves over a much greater extent of the bushes. He supposed they were then still present, but upon repairing to the spot, not a worm could we find, although they had been immensely numerous there only a few days before. The rueful aspect of the bushes stripped quite bare of their leaves attested what greedy cormorants these worms are.

In 1863 the worm made its appearance at Utica and other points in Oneida county, as I learn from several sources, coming like an invading army, thronging the bushes, and through the entire season keeping them so completely defoliated, in this and the following years, that they were mostly killed, and the few surviving plants were so weak and puny as to be valueless. Mr. J. Dagwell informed me he had about a hundred currant and gooseberry bushes, and soon after these worms came upon them, his whole family one day turned out with cups in hand, and in an hour or two picked a bushel of worms, without getting all that were on the bushes. In 1866, residents of Utica informed me they had not seen a currant that year, so universally were the bushes ruined in and around that city.

At Watertown, Mr. W. Ives informs me, this insect made its appearance this year, and kept the bushes so destitute of leaves in

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REACHES ALBANY, RHINEBECK, SARATOGA

most of the gardens, that in three years they were nearly or quite dead. He says the worms appear to be more numerous on low interval lands and along streams of water, than they are in elevated, airy situations upon the hills.

In Albany also, this insect arrived this year, wholly defoliating the currant and gooseberry bushes in many of the gardens.

In 1864, I visited Albany the last of May, to see this worm and its works. In most of the gardens which it had invaded last year it was equally, and, if possible, more destructive this year, and had now spread itself into many gardens in which it had not been seen before. From specimens taken to my own residence, I obtained the flies, from which I saw that the Rochester editors were in all probability correct in regarding this as being the European Gooseberry caterpillar; but I had not in my hands at that time such full descriptions of that insect and its habits as that I felt perfectly assured of their identity.

In 1865 it reached Rhinebeck, making its appearance in the garden of Hon. E. W. Heermance. He informs me it was just as the currants were about commencing to turn red that a whole swarm of most voracious worms were discovered upon a particular bush, eating it naked of its leaves. Some lime and ashes were dusted over the bush, and the worms immediately vanished, and he congratulated himself that he had so easily got rid of these disagreeable visitors. But the worms, without doubt, had then got their growth and were on the point of leaving the bush and going into the ground, and the alkaline powdering did nothing towards driving them away; for in three or four weeks after, the same worms appeared again, and were now scattered in thousands upon every currrant and gooseberry bush in his garden—being so numerous that he was disheartened from attempting to subdue them, and in a few days they had everywhere stripped the bushes bare. He has not heard of their being in any other garden in his vicinity.

In Albany it was not so destructive as in the two preceding years, nor had it spread itself into the country around in force, except it might be in some particular gardens, whilst in others not one of these worms had yet been seen.

In 1866 it first appeared in numerous places in Washington and Saratoga counties. It did not come suddenly in full strength, but insidiously in limited numbers, lurking low down between and underneath the bushes, where it was seldom seen until it had been

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CURRANT-WORM. REMAINS LATER IN DAMP THAN IN DRY SITUATIONS?

present some time, and was then accidentally found. I first discovered it in my own garden on the 18th of June. Being engaged in weeding under a currant bush, I noticed that the leaves had been cleanly eaten from a twig which was hid from view underneath the foliage. Surprised and wondering what currant insect there was that could have done this, in looking further I espied a cluster of worms occupying the leaves of two other twigs contiguous to this one, from one to a half dozen worms standing upon the underside of each leaf. It required but a slight inspection to assure me they were the larvæ of this Currant saw-fly about two-thirds grown. Hereupon examining all my bushes I found a spot denuded of leaves and indicating that a small flock of worms had been feeding there and had probably got their growth and gone into the ground. Another defoliated place was found, where were eleven mature worms, mostly scattered one upon a leaf, the remainder of this flock having no doubt buried themselves. These defoliated spots were in hidden situations and of such small extent that probably one fly produced them, dividing her eggs into separate parcels for the better concealment and security of her young, instead of depositing her whole stock in one place. A currant bush growing alone in my yard was also found to have about a third of its foliage consumed, and thirty-one worms were counted, scattered everywhere over it, one or two upon a leaf, some of them small, others mature, and others no doubt had finished feeding and buried themselves. No worms as yet occurred upon my gooseberries, these furnishing no places for them to feed in such perfect concealment as they found upon the currants. Every leaf upon which a worm was detected was picked and dropped into pots of earth to be fed, that I might observe their further growth and transformations. From this time onwards, none of these larvæ were seen upon my bushes, until the middle of August, when, around the same places where they had previously occurred, were found a number of them half and two-thirds grown, scattered and but one or two upon a leaf. The annual fall of the leaves from the currant bushes was then taking place, whereby no considerable number of larvæ could find sustenance upon them. I think in moist situations and soils of clay loam the currant and gooseberry retain their leaves to a much later period than they do when growing in more elevated, dry, gravelly loam, thus enabling the autumnal broods of these

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PENETRATES FORESTS. FEEDS ON WILD GOOSEBERRIES

larvæ to continue feeding much later in the former than in the latter situations.

In 1857 the flies did not appear in such force in my garden as I expected. The spring was wet and backward, and I did not search my bushes until the beginning of June, when I discovered worms upon them in numerous places, some of them already grown nearly to their full size. Through this season, whenever a worm was discovered the leaves around it were promptly dusted with hellebore; and the bushes continued in full leaf through the season, no very manifest defoliation being perceptible in any place. Through this section of the State, this year, in particular gardens the currant bushes were wholly denuded of their leaves. In many other gardens these worms were known to be present in numbers more or less formidable and threatening; whilst in many others it had not as yet been seen. Numerous inquiries were addressed to me, in reference to this insect. A summary statement of its history, habits and transformations, which I wrote in reply to one of these correspondents, in which was also set forth in the most decided terms the efficacy of hellebore as a remedy, was published in the *Saratogian* newspaper of June 20th, and was copied into several of the other local newspapers, whereby this remedy was much resorted to, and with the most satisfactory results.

The insect continued to advance, appearing this year in many localities beyond those which it reached the preceding year. I am informed by Dr. Gile, of Poultney, Vt., that it arrived in that place this summer, and that in a hunting excursion in the wilds of Northern New York, at Indian Lake, Hamilton county, in the forest fifteen miles distant from any other settlement, he saw the currant bushes covered with these worms, and twenty miles beyond this, at Jessup's settlement, he noticed these same worms thronging a bush of wild gooseberry, which was probably the *Ribes hirtellum*. Although it is reported that it does not feed upon the wild black currant, *R. floridum*, there is no doubt but that it relishes the several species of our native gooseberries, *R. lacustre*, *Cynosbati*, *hirtellum et rotundifolium*, one or more of which are growing everywhere in our woodlands, and it will consequently be able to advance through an unbroken wilderness as readily as through districts that are cleared and cultivated.

In the historical account which has now been given of the introduction and progress of this insect in our country, many of the

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facts relating to its habits and economy have incidentally been stated which it will be unnecessary to particularly repeat now, when we come next to treat upon its transformations and describe the different forms in which it appears.

The flies break forth from the cocoons and emerge from the ground, in our State, the latter part of April. The exact date of their beginning to appear will vary in different years, as the season is early or late, and will be a week or more earlier in the southern than in the northern sections of the State. Everywhere some of them will come forth in season for the sexes to pair and the females to commence the deposit of their eggs just as the leaves of the gooseberry and currant are bursting from their buds and beginning to unfold.

The EGGS are placed on the underside of the leaves. Mr. Curtis states they are placed close by the side of the larger veins. Those which I have observed have mostly been glued lengthwise along the summit of the ridges formed by the larger veins. They are shining, watery-white and translucent, of a short cylindrical form with rounded ends. Before hatching they become more opake, and swell and increase in thickness but not in length. They hatch in six or seven days, in summer, but in the cool weather of early spring the period is probably longer.

The YOUNG LARVÆ when they come out from the egg shells are watery-whitish and translucent, six times as long as thick, and one tenth of an inch in length. Their bodies are cylindric with the heads thicker, more shiny and pale dirty yellowish-brown, with three conspicuous pairs of feet placed on the breast. When they begin to eat, their bodies immediately acquire a green tint and their heads become smoky. They, on leaving the egg, distribute themselves over the disk of the leaf, avoiding its margin, and each one eats a small round hole through the leaf, whereby it becomes riddled with these holes. They continue eating the edge of the hole, enlarging it, and as soon as it is sufficiently large to receive them they stand in it, with their backs strongly bent. They move backwards as they continue to eat, each one along the edge of its hole, enlarging it more and more, till the holes meet and become confluent and oblong, occupying the spaces between the veins, and being of different sizes, with two, three or more worms now eating along the edges of each hole, until it extends to the outer margin of the leaf, thus taking all or nearly all of the parenchyma of the

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leaf and leaving only the veins. They drop a multitude of little black grains upon the leaves below them, which enable us frequently to discover broods of these worms which would otherwise escape our search.

When one leaf is consumed they migrate to another. And as they increase in size, so often as their skins become uncomfortably tight, they cast them off and come out in a new dress. These evacuated skins are frequently seen, having their tips hooked around a leaf-stalk or the margin of a leaf, with the head end hanging downward, looking as though the worm in wriggling out of it had dropped itself to the ground. They are a shrivelled and distorted mass, the skin being of a flesh-red color wherever it is seen in the interstices between the shining black warts, which occupy most of the surface, the black bristles and black anterior legs projecting out in every direction—the black, shining head, similarly bristled, appearing at one end of the mass, split asunder into two segments.

As they increase in size they become more voracious, and were a whole brood to continue together, one leaf would not suffice to feed them an hour. They, therefore, separate, and as they approach maturity become more subdivided and scattered around the spot which they occupy, until commonly only one, two or three are found on a leaf, which they commence eating at its tip, consuming it more and more as they progress towards its base. They continue to increase in size with each successive change of their skins, until they attain three-fourths of an inch in length.

The LARVA when nearly or quite mature is about six times as long as thick, and of a cylindrical form, very slightly tapering towards its tip, which is usually held in a curved position, either downward, upward, or to one side. It is shining and greasy-looking, of a pale bluish green color with the neck and the segment next to the last pale greenish yellow. It is ornamented with numerous elevated polished black dots, each one of which gives out a short black bristle. These dots are symmetrically placed in rows running both lengthwise and crosswise of the body, there being along the back twenty-four dots in each row. Each abdominal segment has three transverse rows, with four dots in the first, six in the second and ten in the third, with an additional dot between the lower ends of the second and third rows, and another much larger one below the ends of the first and second rows, this last dot having two others below it, on the base of the prolegs. On the thoracic segments the dots are fewer in number and differently arranged. The extreme tip of the body is tinged with yellow, with a black spot on its upper side, and two short horn-like processes. The head is black, highly polished and studded over with bristles. On the underside are three pairs of true legs, anteriorly, on the breast, which taper to a sharp point and are black and shining. With these the larva clings to the leaf when it is feeding. They occupy the three first

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rings, and the fourth ring is destitute of legs, but on each of the six rings following it and also at the tip is a pair of short, thick, fleshy, retractile prolegs, of a pale color, which the larva protrudes to aid it when crawling.

When they are done feeding they cast their skins again, and then become very much changed in appearance from what they have previously been, all vestiges of the shining black dots having vanished, and the worm being now of a very pale pea-green color, almost white, with the neck and the penultimate segment sulphur yellow, and the head pale like the body, with a small black dot upon each side. When it has come out thus colored it crawls slightly away from its cast-off skin, and then remains at rest and motionless about five or six hours. It then crawls down the currant stalk and goes into the ground, burying itself slightly under the surface. It here incloses itself in a yellowish cocoon of a very dense membranous texture and a regular oval form, in which it changes to a pupa, and lies reposing for about a fortnight. In two instances in which I particularly observed the dates, it being in the month of June, the flies came forth, one on the twelfth the other on the fourteenth day after the worm entered the ground.

The FLIES are 0.38 long to the end of the abdomen and wings, but in the preserved specimen the abdomen shrinks and the body measures but about 0.30 to its tip. They are 0.70 in width across the extended wings. The *head* is black and shining, very slightly clothed with short gray pubescence. The edges of the orbits of the eyes are distinctly of a dull whitish color in the living specimen, but after death this color fades and becomes imperceptible. There is also a dull white spot between the antennæ. The mouth is more clear dull white, the jaws or mandibles being black, except at their bases. The antennæ are black, their undersides dull brown; they are three-fourths the length of the body, slightly more slender towards their tips, nine-jointed, the two first joints small, the third joint slightly if at all longer than the fourth, the remaining ones successively slightly diminishing in length and thickness. The *thorax* is pale yellow, shining, and clothed like the head and antennæ with short gray pubescence. It has on the back three large black spots occupying the elevations of the lobes, which spots are usually more or less confluent, and back of these are smaller black transverse spots. Beneath, the middle of the breast is black, a black spot anteriorly occupies the collar, and on each side is a triangular black spot, placed obliquely, below the wing sockets. On the last segment are two elevated dull white dots. The *abdomen* is bright wax-yellow, fading after death to pale lurid brown; its base above is smoky. The *wings* are hyaline, slightly smoky; the veins and the thickened outer edge of the upper pair ending in a callous spot called the stigma, are black, the inner side of the stigma sometimes having a pale tinge. The upper wings have one marginal and four submarginal cells; the first submarginal cell is quadrangular and nearly equilateral, its inner anterior side longest; the second cell is elongated hexangular, twice as broad anteriorly as posteriorly, the two veinlets at its ante-

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rior end equal or the inner one slightly longer than the outer, receiving two recurrent veins, the hind one but little forward of the hind end, and having a brown dot back of the centre and slightly nearer the inner than the outer boundary; the third cell is small, quadrangular and twice as long as broad, usually widening backward, joined by no recurrent veinlet; the fourth cell as long as the second and double its width, its hind end twice or thrice the width of its anterior end, sometimes incomplete, the vein on its inner side being more or less atrophied. The *legs* are dull white, the hind pair having the feet and tips of the shanks black. Several of the parts which are black in the living insect fade to brown in preserved specimens.

In many neighborhoods it is a mooted subject whether the fruit which ripens on bushes which have been thronged by these worms is not poisonous and unsafe to be gathered and used. Rumor is ever ready to report that in the next town one or two children have died from eating these currants. Meeting a man who desired to know my opinion upon this subject, I was told he had heard a strenuous advocate of this poison theory, relating in a public place that he had my authority for saying that such currants were poisoned and ought never to be used. This illustrates how unscrupulous men are apt to become when excited by controversy. Those who are so prejudiced against using these currants ought never to taste a worm-eaten apple, for assuredly a worm crawling around inside of a fruit and feeding upon it will be much more apt to impart poison to it than one which merely walks over or rubs against its smooth outer surface. When the bushes are stripped bare of their leaves, the fruit which ripens on them will not be so plump and perfect, it will be slightly wilted and shrunken, and possibly such fruit may not be quite so healthy as that which is perfectly grown—though an apple which is slightly wilted from being worm-eaten is more palatable and also more digestible than one which is fresh and sound. But that such currants are "poisonous," in any sense of the term, I am confident is erroneous. I bind upon the skin of my arm a worm which has just now been killed by hellebore. At the end of six hours I have not felt the slightest smarting or irritation of the part; and on removing the worm the skin is not at all reddened, as it would be were there any acrid or vesicatory property pertaining to this larva as there is to several other insects and their larvæ. And we have no evidence that any poisonous quality whatever, pertains to these worms.

A most important topic is yet remaining to complete our account of this terrible pest to the gardener, namely, a notice of the most

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important remedies for destroying it and saving the currant and gooseberry bushes from its ravages.

The remedy which transcends all others in its efficacy for destroying the larva of the Currant Saw-fly, is the root of the white hellebore, *Veratrum album*, either dried and ground into an impalpable powder, or a decoction made by boiling it in water and when cold sprinkling the leaves therewith from a watering pot. Words fail us for suitably expressing the value of this substance. In the whole round of remedies for injurious insects we know of no other one that is so efficacious, we know of no other one that possesses such virtue for destroying any insect as does this substance for destroying this larva. It is a sovereign cure for the evil. It is a specific. It operates like a charm. Easy of application and certain in its effects, it is all that can be desired. The larva does not require to eat it. It kills the moment it touches. In the words of R. Lymburn, "wherever a particle reaches a caterpillar, it collapses as if stabbed," yes, as if stabbed to the heart. Every one who notices this powder as it falls upon a worm will confirm the literal truth of this statement. The worm is instantly convulsed with a death spasm, rolls off the leaf and drops lifeless to the ground. It is "a spectacle wonderful to behold." But if standing on the underside of a leaf where the powder does not touch it, when it afterwards comes to eat a particle of it, its doom is sealed with equal certainty.

In addition to the statements of the efficacy of this remedy, which have incidentally been made in the foregoing pages, a few others may here be presented.

D. G. had 3,000 gooseberry trees so covered with caterpillars that in a few days not a leaf would be left. He got six pounds of the white hellebore powder, and dusted the plants over from a large pepper box, and it completely killed all the caterpillars upon them. (*Gardener's Chronicle*, 1842, p. 365.)

The *Ithaca Journal* says: "We know from repeated experiments that powdered hellebore sprinkled on the bushes in quite limited quantities, will clear the worms in double quick time. We have succeeded in completely eradicating them from ours, and have the promise of a superb crop."—(*Rural New Yorker*, vol. xv, p. 207.)

S. Edwards Todd, of Auburn, states that he has found that pulverized white hellebore will effectually destroy every worm in less

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than an hour, without injuring either the fruit or the bushes. (*Country Gentleman*, vol. xxiii, p. 383.)

W. B. Smith, of Syracuse, says he has effectually destroyed these worms on a plantation of half an acre, by dusting white hellebore over the leaves. It was not necessary to cover all the leaves nor to apply it on the under side, as the first mouthful which any one took, killed it. The powder is retained by the rough surface of the leaves but is quickly washed from the glossy surface of the fruit.—(*Country Gentleman*, vol. xxvii, p. 110.)

Numerous other published statements to the same purport with the preceding might be presented, but it is unnecessary. Within the circle of my acquaintance, every one who has used this remedy expresses himself as being perfectly satisfied and delighted with its operation, except in a single instance. One friend informs me he could not perceive that it had any effect. And in the *Gardener's Chronicle*, 1842, p. 349, a correspondent states that he completely covered several larvæ with hellebore powder, and confined them under a wineglass on paper strewed with this powder, several hours, and they appeared to experience no inconvenience whatever. It does not admit of a doubt that in both of these instances a worthless article was used. If it really was hellebore which these two persons received from the druggists, it was so old and had been lying so long in the drawers of the shops that it had entirely lost its properties. The purchaser should assure himself that the article which he obtains is genuine, as this is so readily ascertained. Hellebore is such a powerful sternutatory that it has long been in use as the basis of those snuffs which are designed to excite violent and continued sneezing, and the smallest pinch of its powder, brought near the nostrils, by the tingling sensation it produces in them will sufficiently attest its genuineness. And in dusting it over the bushes, one soon learns to stand where any slight breeze which may be in the air will not waft any of the finer particles to his own face. It is ground into such an exceedingly fine light powder that it can only be used with economy when the atmosphere is nearly or quite still, so large a portion of it is wafted away and wasted if any wind is blowing.

Much the most convenient mode of dusting this powder far down between the bushes or elsewhere that a worm occurs, I find is to put about a gill of it into a small bag made of very fine muslin, and tie the mouth of this bag around a stick about eighteen

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inches long. Using the stick as a handle, the bag can readily be passed in among the bushes to any point where a worm is seen, and a slight shake being given, it sifts the powder out upon the very leaves on which we desire to dust it. The slightest quantity distributed over the upper side of a leaf is equally as effective as a thick coating would be.

The green hellebore, *Veratrum viride*, of our country, a plant growing everywhere in our moist meadows, and commonly called "poke," with its large leaves prettily plaited lengthwise, and so compacted together as to give it some resemblance to a cabbage, is so closely like the white hellebore of Europe that botanists are not fully agreed that the two are really distinct species. The root of our American plant will undoubtedly be as efficacious for destroying this currant worm as is the imported hellebore. But this latter is so readily obtained from the druggists at such a moderate price, and comes to us ground to such a fine dust, and ready for immediate use, that we have no occasion for resorting to the latter. But if in any place the white hellebore cannot be had, our American plant is everywhere at hand; and a decoction of its roots sprinkled upon the bushes from a watering pot, will undoubtedly be found to be perfectly effective.

Next to this remedy, the most effectual one for subduing this insect and saving the currant and gooseberry bushes from its ravages, appears from the experience of many persons to be the slow and tedious process of hand-picking. Some have recommended gathering the flies when they first issue from the ground in the spring. Robert Gray, of Dristwich, states in the *Gardener's Chronicle*, 1855, *p.* 281, that he spent an hour or two in the morning for a few days and caught several hundred flies, thus lessening their numbers so that but few eggs were afterwards found on the leaves. And R. Varden, of Seaford Grange, writes (*p.* 317) that through the middle of April (the flies coming forth there somewhat earlier than they do here in New York) his men before breakfast tapped the bushes with a stick, when the flies would generally dart to the ground and could be easily secured, thus sometimes getting nearly a pint of them, their bodies full of eggs. There cannot be a doubt this is a very advantageous step to take.

Slacked lime sifted upon the leaves two or three times a week seems to be the next most successful remedy for destroying the worms, but the testimony as to its efficacy is quite conflicting.

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COAL ASHES. ROAD DUST. OTHER REMEDIES.

An item has lately gone the rounds of the newspapers, stating that "Robert J. Swan, of Geneva, keeps his currant bushes entirely free from currant worms by the use of coal ashes. Cover the ground about each bush four or five inches deep for a distance of two feet on each side. The mechanical sharpness of the ashes prevents the soft larvæ from rising through them." I think this may be a valuable measure. It is not probable that the fly on hatching would be able to make its way up though such a depth of these ashes, or that the larva will bury itself in them to form its cocoon. We doubt whether the insect will remain where it is so much discommoded.

I. H. Robinson, of Rochester, finds that frequently sifting coal ashes over the bushes when the dew is on, prevents the ravages of these worms. (*Rural New Yorker*, vol. xiv, p. 255.) And of a similar purport is the following:

If road dust or the fine dust from any dried clods is sprinkled on infested bushes, the caterpillars will soon disappear, says a correspondent of the *Gardener's Chronicle*, 1842, p. 526. And in the *Rural New Yorker*, vol. xvi, p. 183, H. Stanton, Jr., of Syracuse, states that fine dry road dust sprinkled and thrown up under the bushes wherever the worms appear will destroy them and completely stop their ravages. He tried it the preceding year with perfect success. We cannot think any inert powder like dust or coal ashes will be of any avail except to put the worms to the inconvenience of traveling away to leaves that are clean.

Whale oil soap, two pounds dissolved in a few gallons of hot water, and sufficient water added thereto to make fifteen gallons, is reported by R. N. Parke, of Waterloo, N. Y., to destroy these worms upon a few applications. (*Rural New Yorker*, vol. xii, p. 199). This has been extensively used, some being satisfied with it, others finding little or no benefit from it.

Quite a number of other articles—sulphur, sulphur fumes, salt, soot, wood ashes, strong soap suds, decoction of foxglove, tobacco water, copperas water, &c.—have been brought to notice by one and another, in the public prints, as remedies for these currant worms, but have failed to gain any public confidence in their efficacy.

As none of the foreign accounts which we have seen allude to any parasitic enemy of this Currant Saw-fly, it seemed quite improbable that it would in this country meet with any such enemy, to

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lighten from us the task of combatting it and diminishing its devastations. But our valued friend J. A. Lintner, of Schoharie, greets us with the glad tidings that he has discovered we have such a foe to this formidable scourge. An egg parasite of this saw-fly inhabits our State, an exceedingly minute Hymenopterous insect, which inserts its eggs into those of the saw-fly, that its young may subsist upon and consume the contents of those eggs. This diminutive little fly has probably existed hitherto upon the eggs of some one of our American saw-flies similar in size to those of the Currant Saw-fly; and it has now discovered that the eggs of this newly arrived foreigner are equally well adapted to its wants. And so multiplied has this little friend of the gardener become, that in Utica Mr. Lintner finds that among fifty eggs of a saw-fly upon a currant leaf, there will not be more than four or five that will hatch currant worms, all the rest being occupied by the little maggot, the young of this parasite. At Schoharie, also, where the saw-fly has arrived more recently than at Utica, he finds this parasite is now beginning to appear. Everywhere this little creature is no doubt following upon the tracks of the saw-fly, and within a very few years after the one arrives in any place the other will be there also, and will speedily become so multiplied as to quell and extinguish it. This is a most important discovery, and renders it quite probable that in this country this currant worm can never be but a temporary evil. Whenever circumstances favor it and enable it to multiply and become numerous in any section of our country, this little enemy, its mortal foe, will speedily be there to subdue and stamp it down. Thus nicely are the works of nature balanced, and no creature is permitted to usurp a place in her domain which does not belong to

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DONATIONS

TO THE

LIBRARY AND MUSEUM.

Mr. W. Miles, Lansing, Mich. Catalogues of Agricultural College, and Address by Governor Crapo, May, 1866.

First Annual Report of the American Dairymen's Association for the year 1865. From W. H. Comstock, President, Utica.

Dr. John C. Dalton, New York. Bulletin of the New York Academy of Medicine—members, officers and reporters for 1867; 90th session.

John C. Merritt, Turningdale. Noxious weeds—Snap Dragon, Daisy, Mayweed, Sharp or Moses weed, Foster's Meadow Clover, Sheep Sorrel.

D. Van Nostrand, New York, 192 Broadway. Catalogue of Domestic and Foreign Books—on Architecture, Military, Naval, Scientific, Historical Works, &c.

List of Premiums awarded by the Pennsylvania State Agricultural Society, at the State Fair at Easton, 1864, 1865, 1866. From A. Boyd Hamilton, President, Harrisburg.

CRUELTY TO ANIMALS. Lecture by Mr. Henry Bergh, at Albany, before the Legislature, February 1st.

New England Farmer, Boston, monthly.

Food in its relations to the Various Exigences of the Animal Body. By J. B. Lawes, F. R. T. F. C S., Rothamsted, England; and J. H. Gilbert, D. F. R. S. T. C. S., Philadelphia, 1866.

Transactions Pennsylvania Horticultural Society for 1865. From Thomas Meehan, Corresponding Secretary. This is a very interesting and valuable report. Besides the proceedings of the Society, there are some very valuable essays. One on the Curculio, by Prof. S. S. Rathvon, Lancaster, Penn., is a very interesting article, and should be examined by all our fruit-growers.

Annual Report Woodlawn Cemetery. From Mr. Clift, Comptroller.

Report of the Agricultural Department for November and December, 1866.

Meteorological Observations for 1866. From M. W. Beauchamp, Skaneateles.

Andrew S. Tuller, N. J. Forest Tree Culturist, by M. Tuller. A very useful work.

De M. P. Aymar-Bression. Journal Mensuel Le Academie Nationale, Paris. December, 1866.

Saml. J. Thorburn's Catalogue of Garden, Fruit and Field Seeds, &c., for 1867.

Annual Meteorological Synopsis for the year 1866. By J. B. Trembley, M. D., in the city of Toledo, Ohio.

The Market Assistant. By Thomas F. Devoe, New York. Abattoirs. From Thomas F. Devoe, New York.

Journal L'Academie Nationale. France, January and February, 1867. From De M. P. Aymar-Bression, Paris.

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Governor's Message, 1867.

Comptroller's Annual Report, 1867.

Grossherzogthum Oldenburg Statistischen Bureau for 1866.

The Union Monthly for February, 1867. From Dr. Duffey, Albany.

Birds of North America. By D. G. Elliott, New York. No. 4.

Die Badenlung Moderner Gradmessungen. C. Midmann, Biblisrhsadt.

Blackwood & Sons, Edinburgh. "Old Remarkable Trees" of Scotland.

Appleton's Catalogue of Books for 1867. 443 Broadway, New York.

Report of the State College of Agriculture of Maine. From M. F. Drew, Clerk.

Annual Report for 1867. From Hon. George Geddes, Superintendent of Salt Springs.

Speech of Henry J. Raymond, of New York, on Admission of States lately in Rebellion.

C. F. Hagedorn, Esq., Consul, Oldenburg, Philadelphia. Statistishe Nachricten, uber das.

Transactions of the Jefferson County Agricultural Society for 1866, published in pamphlet form.

Twenty-six valuable volumes for the Library of the Society, from President M. R. Patrick.

Journal d'Agriculture de Belgique for February, 1867. Brussels per De S. M. Leopold, 2d Roi des Belges.

Hon. G. W. Bradford, Homer. Four volumes of the Transactions of the State Agricultural Society.

Twenty-ninth Annual Report of the Board of Education of Massachusetts. By the Secretary of the Board.

Three copies of the Economist, published in Melbourne, Victoria, Australia. From Thomas Learmonth.

Report of the Department of Agriculture for 1865. From Hon. Isaac Newton, Commissioner; ten volumes.

Transactions of the Norfolk Agricultural Society of Massachusetts for 1866. From A. W. Cheever, Sheldonville, Mass.

Transactions of the Massachusetts Horticultural Society for the year 1866. From Samuel H. Gibbens, Boston.

Third Annual Festival of Berkshire, held at North Adams, Mass., December, 1866. From Arthur Gilman, Esq.

Memoire de le College et l'Ecole d'Agriculture De St. Anne, Canada. From T. Pilotte, Otre. Procurur du College.

Vilmorin, Andrieux & Co., Paris. Supplement aux Catalogues and List of Plants. No. 4 quai de la Miggesserie.

Transactions of the Illinois State Horticultural Society for 1866. From W. C. Flagg, Corresponding Secretary, Alton.

Hawaiian Gazette, received from J. Q. A. Warren, Esq., contains a directory of Honolula, and many interesting articles.

Premium List of the State Agricultural Society of Illinois. From J. P. Reynolds, Secretary.

From the State Library of Munich, to the New York State Agricultural Society. Die Entuidlung der Ideen in Natturmissenfchaft.

Amateur Cultivator's Guide to the Flower and Kitchen Garden. From Washburn & Co., 100 Tremont street, Boston, Mass.

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Journal de la Societie Centrale D'Agriculture de Belgique for January, 1867. From De S. M. Leopold, 11 Rue des Belges, Bruxelles.

Extract from General Catalogues. From Vilmorin, Andrieux & Co., 4 quai la Miggisserie, Paris.

Meteorological Table for the year 1866. From Storrs Barrows, South Trenton.

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Transactions of the Highland and Agricultural Society of Scotland, fourth series, No. 2, for 1866 and 1867. From Fletcher Norton Menzies, Esq., Secretary, Edinburgh.

Catalogue of Short-horned cattle belonging to Edward Ladd Betts, Esq., England, to be sold May 1; also a Catalogue of Short-horns owned by David McIntosh, Esq., to be sold May 2.

Report of the Westchester County Agricultural Society. From James Gibson, President.

L'Agricultura Societa Agraria Di Lombardia. Milano, April. No. 4.

Inspector-General's Report, 1866. From George S. Batcheller, Inspector General.

Origin and History of the Construction of the Erie Canal. By George Geddes 1866.

Journal Chemico Agricultural Society, Ireland, for April. From Prof. Hedges, Belfast.

Library Catalogue of the Massachusetts Horticultural Society for 1867. From the Secretary.

Two volumes Transactions for 1851. From Nelson J. Beach. Two volumes Institute. 1848–49.

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The Farmers' Journal. By A. DeLancey Brigham. For the farm and the family.

The American Naturalist for March and April. This is a very interesting magazine. Published by Essex Institute, Salem, Mass.

A short treatise on the Milk-weed or Silk-weed, and the Canadian Nettle, viewed as industrial resources, by Alexander Kirkwood, and read before the Ottawa Natural History Society February 15, 1867. From A. Kirkwood, Ottawa.

Journal Royal Agricultural Society, England. 1867.

Woodward's Record of Horticulture for 1866. From the proprietors. New York: Andrew S. Fuller, editor.

Catalogue of the Sculpture, Paintings and Engravings and other works of art belonging to the corporation of London, together with books not included in the Guildhall Library, 1867.

Southern Planter, Richmond, Va. New series, from January, 1867.

The Hammonton Culturist, edited by A. M. Spangler, and published by E. Wallack, Philadelphia, and Hammonton, N. J.

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Report of T. T. Lyon and Sanford Howard, Esq., to the Michigan Legislature, relative to the preservation of Forest Trees.

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THE FARM AND THE GARDEN. First number of a new agricultural paper, published at Clinton, S. C., by James R. Jacobs & Co.

Annual Report of Wilmington Institute, Wilmington, Delaware. From Mr. Canby, Esq.

Southern Planter, No. 5, Richmond, Virginia.

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Monthly report from the Agricultural Department, Washington, for May and June.

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Le Vin, par A. D. Verquette-Lamotte, Paris—correspondent de l'Institute, Librarie Agricole de la maison Rusteque.

From Sanford Howard, Esq., of Lansing, Mich., a report of Michigan Board of Agricuture for 1866.

Hon. O. B. Matteson, of Utica, 44 volumes of the Patent Office and other documents.

L'Agricultura Milano Societa Agraria. Di Lombardia con Annunsy. No. 5. 1867.

Transactions of the Berkshire Agricultural Society for 1866. Address by Rev. John Bascom.

Premium List of the Putnam County Agricultural Society for 1867.

Iowa State Agricultural Society. List of Premiums for 1867.

Received from General Consulate, in New York, the Proceedings of the National Exhibition held in Vienna (Wien), in 1866.

Annals of the Lyceum of Natural History of New York, vol. 8, No. 13. Oran W. Morris, Librarian.

Remarks of Mr. Geddings, of Anne Arundel, on report of committee on Labor and Agriculture in the Maryland Convention, June 17, 1867, recommending the establishment of the office of labor and agriculture. A very able and interesting document.

Department of Agriculture, Washington, monthly report for April, 1867.

C. E. Davenport, Secretary Rensselaer Agricultural Society. Copies of Premium List and Regulations.

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Madame Riedesel, Memoirs and Letters in press. J. Munsell.

Address of Mayor Thacher before Common Council of Albany, May 7, 1867.

Royal Horticultural Society's Proceedings, London, for February and March, 1867.

Proceedings of the Dairyman's Convention, Rockford, Ill. From Hon. Anson S. Miller.

James Rees, Esq., of Utica, sends us a valuable collection of old works for the Library.

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Der Verein Tur Natur kunde ze, Presburg E. Mack, Secretary, January, 1864, 1865 and 1866. Dr. Flugell, Leipzig.

Steuben County Premium List. From Reuben E. Robie, Secretary, Bath.

Premium List of the Cayuga County Agricultural Society. From L. C. Mann, Treasurer.

Niagara County Premium List and Regulations for 1867.

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Chenango Agricultural Society. List of Premiums and Regulations. From C. R. Frink, Secretary and Treasurer, Norwich.

Wochenschrift des Vereins zur Befridernsg ze. By Prof. Dr. Karl Koch, General-Sexretair des Vereins, Berlin, January, 1866, to 29th December, 1866. Dr. Flugell, Leipzig.

Premium List of the Ninth Annual Fair in Minnesota, 1867.

S. D. Morse, Corresponding Secretary of the Missouri State Board of Agriculture, four volumes Agricultural Report for 1866, and Statistical Report of Missouri. Premium List.

X. A. Willard's Address on English Farming.

American Fruit Culturist, by J. J. Thomas, with illustrations. Wm. Wood & Co., New York.

Smithsonian Collection, volume 14th. From J. Henry.

Smithsonian Collections, miscellaneous, two volumes.

Economist, May 17th, from Australia. A very excellent paper. From Thos. Learmonth, Victoria.

Tenth Annual Report of the Central Park, New York. From Alexander H. Green, Esq., Comptroller of the Park.

Boston Society of Natural History, S. L. Abbott, Secretary. Journals, 7; Proceedings of the Society, 8.

F. B. Hough, M. D. Prize Essay on Medical and Vital Statistics, before the State Medical Society of New York.

Circular of the Massachusetts Agricultural College. From W. S. Clarke, President.

Smithsonian Institute. Publications from Europe—Manchester Free Library, England; Royal Horticultural Society, London.

Seventh volume Transactions of the Board of Agriculture, Connecticut, from 1864 to 1866. From T. S. Gold, West Cornwall, Conn.

Academie Nationale. Agricole manufacturiers et Commerciale. Paris, France. From De M. Aymar-Bression. July and August, 1865.

De Bow's Review, monthly. Principal offices, Nashville, Tenn., and 80 Broadway, New York.

New England Homestead, Northampton, Mass., Henry M. Burt & Co., proprietors. New magazine.

A copy of the last Census. From Hon. F. C. Barlow, Secretary of State, for the use of the Commission of Abortion, who are engaged in the prosecution of their work.

Calendar for 1867, Munden. C. F. Hagedorn, Bavarian Consul; and various publications from the Government of the Kingdom of Bavaria for 1862, 1863, 1865 and 1866.

Annual Report of the Royal Bavarian Government, and the Agricultural School of Wichenstephen for 1865 and 1866. Through C. F. Hagedorn, Bavarian Consul, Philadelphia.

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Report of the Superintendent of the Orphans' House for 1865, at Weimar, from the Government of the Grand Duchy of Saxe-Weimar. C. F. Hagedorn, Consul Saxe-Weimar, Philadelphia.

Reports on the Agricultural Exhibitions at Vienna, and Aarhuus, Denmark. By John Wilson, F. R. S. E., Corresponding Member of the New York State Agricultural Society, and Professor of Agriculture in the University of Edinburgh.

Annual Report of Hon. Thomas Hillhouse, Comptroller, New York, for 1867.

L'Agricultura Societa Agraria Di Lombardia. Milano, No. 7. 1867.

Journal Mensuel, L'Academie Nationale. By De M. P. Aymar-Bression. June and July, 1867.

P. S. Danforth, Middleburgh, Schoharie, six volumes Transactions New York Institute, in exchange.

United States Coast Survey for 1864. From Superintendent Benjamin Pierce, of Washington, D. C.

Department of Agriculture, Washington. Monthly Report for April, 1867.

Annual Catalogue from J. Vanderbilt & Brothers, 23 Fulton street, New York.

Illustrated Prize List of Thoroughbred and Imported Stock. L. B. Silver, Salem, Ohio.

The Forty-sixth Annual Report of the Mercantile Library Association of New York.

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NOTE.

Very important information began to be received respecting the Texas cattle disease, which has ravaged the Western States during the past summer, just as this volume of our Transactions was ready for the press.

Although this volume professes to treat of the operations of the Society during the year 1867, yet, as a knowledge of this malady was so important to be placed in the hands of farmers at the earliest possible moment, we deemed it proper to risk an anachronism for their benefit, and have, therefore, held back the publication of the volume, in order that we might give the following very important paper, which we think will commend itself to every cattle-owner in the State as a most valuable and practical contribution to agricultural science, and be a sufficient apology for delaying the publication of the volume.

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REPORT

OF THE

N. Y. STATE CATTLE COMMISSIONERS,

IN CONNECTION WITH THE

SPECIAL REPORT OF THE METROPOLITAN BOARD OF HEALTH,

ON THE

TEXAS CATTLE DISEASE.

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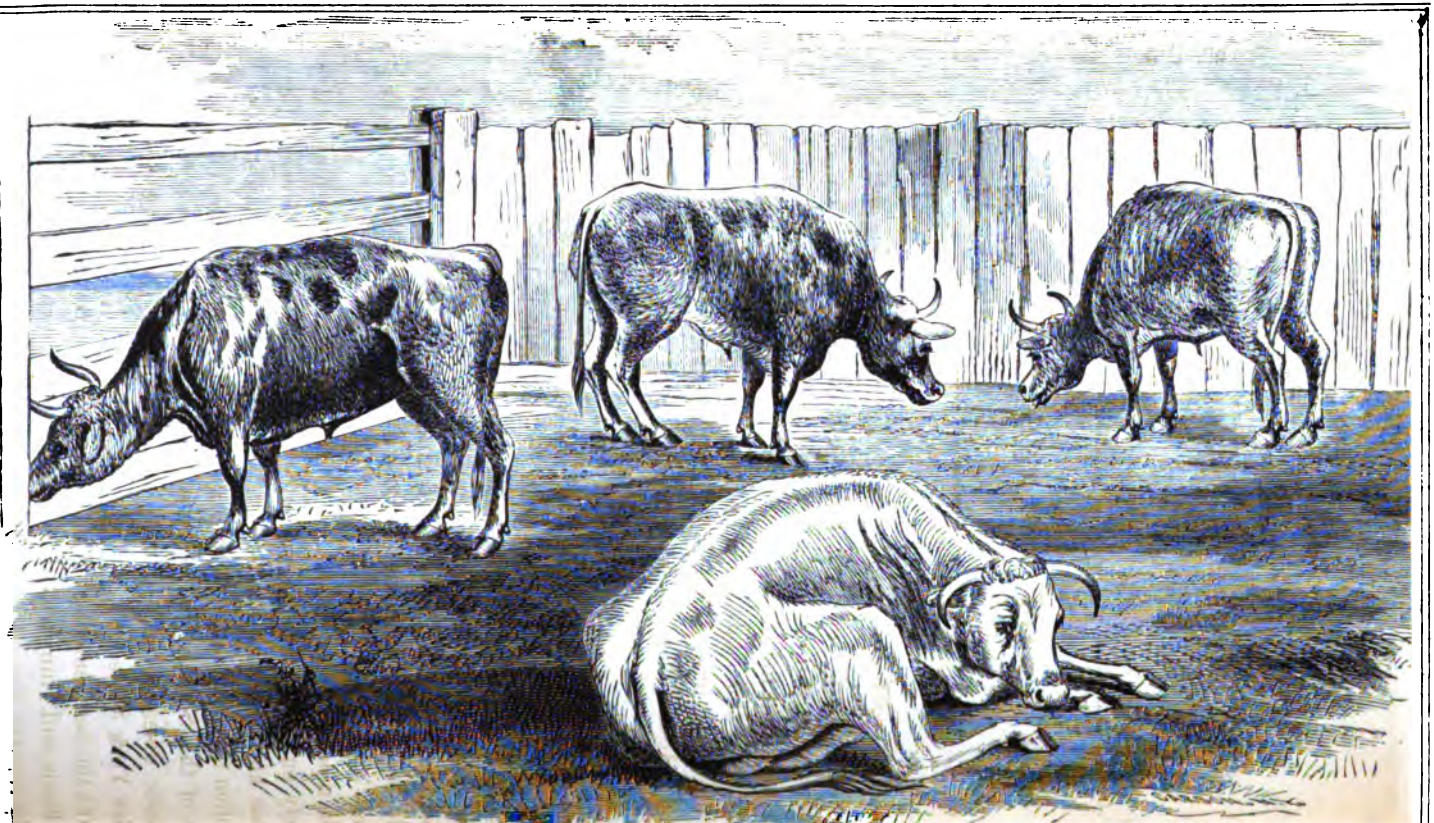

Plate I. Appearance presented by Bullocks, suffering from Texas Cattle Disease.

Sketched from nature, by Rob't Kœhler.

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REPORT OF THE NEW YORK STATE

CATTLE COMMISSIONERS,

FOR THE YEAR 1868.

To the Honorable the Legislature of the State of New York:

The Board of Commissioners, organized under "An act to prevent the introduction and spread of the disease known as the Rinderpest, and for the protection of the flocks and herds of sheep and cattle in this State from destruction by this and other infectious diseases," passed April 20, 1866 (chap. 740), and amended April 19, 1867 (chap. 453), respectfully

REPORT

That the disease known as Rinderpest has not, since the date of their report for 1867, reäppeared in the British Isles, or in any of those countries in Europe from which cattle are usually brought to the United States; and it is believed that, with the knowledge we now have of the disease itself, and of its treatment, its ravages would be speedily checked, should it, by any accident enter our State.

The report of the Hon. A. B. Conger, of the State Agricultural Society, on the "Statistics, pathology and treatment of the epizoötic disease known as the Rinderpest," is an exceedingly valuable contribution to veterinary science, and its publication in the Transactions of the Society, will very widely extend the knowledge of epizoötic diseases, and their treatment, among the stock owners of New York State.

With the banishment of Rinderpest to its native steppes in Southern Russia and Hungary, all fears in regard to the safety of cattle in this country passed away, and a sense of security was felt by all engaged in breeding, feeding and handling stock.

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FIRST APPEARANCE OF TEXAS CATTLE DISEASE.

About the 10th of June last, however, a disease appeared at Cairo, the southern terminus of the Illinois Central railroad, at the junction of the Ohio with the Mississippi river, where large numbers of cattle from Texas were being landed, and shipped thence, by rail, to the interior of Illinois and Indiana.

This disease was soon recognized as "Spanish fever," so called in the Gulf States; but better known in more Northern States as the "Texas cattle disease"—a scourge that had repeatedly crossed the Texan border and swept off immense numbers of cattle in Kansas and Missouri, previous to the late civil war, causing the enactment of prohibitory laws in those States, relative to the introduction of Texas cattle.

From Cairo the disease was conveyed along the railway lines into the interior of Illinois and Indiana, reaching the little town of Tolono, at the crossing of the Illinois Central and Toledo and Wabash railroads, about the 20th of July, and speedily sweeping away almost every native animal of the bovine race in that neighborhood—two hundred and thirty-five cows having died between that date and the first of August.

ITS RAVAGES IN ILLINOIS.

From fifteen thousand to eighteen thousand head of Texas cattle had been landed at Tolono, resulting in the estimated loss of five thousand head of native cattle in the county of Champaign alone,* while multitudes were dying in other parts of that State and Indiana; and stock destined to Eastern markets had become diseased to such an extent, by the 5th of August, as to endanger the lives of meat-consumers in the cities that draw their supplies of beef from the Western States.

METROPOLITAN BOARD OF HEALTH.

By the 8th of August, it became apparent to the officers of the Metropolitan Board of Health in New York city, that the alarming increase of obstinate and fatal diarrhœas in the Metropolitan district, was caused by the use of diseased meats, and measures were instantly taken to arrest the evil. The action of the Board, wise, energetic and far seeing, not only averted the calamity that threatened the city, but far beyond all this, by the rigid investigation it conducted in regard to the nature and character of the disease,

* See page 6, "Report of Delegates of Board of Agriculture, Province of Ontario."

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large contributions have been made to sanitary science, generally, and certain great laws of hygiene established for the future.

ACTION OF THE STATE EXECUTIVE.

His Excellency Governor Fenton, after corresponding with the Governors of New Jersey and Pennsylvania, who coöperated with him in his efforts to check the progress of this fearful plague, summoned the Rinderpest Commission, as it was called, to meet him in Albany on the 17th of August, at the Executive chamber.

ACTION OF THE STATE COMMISSION.

In obedience to the summons, the Commission met, and received from His Excellency all papers and correspondence that had come to him on the subject, with instructions to carry out the provisons of the acts of the Legislature establishing the Commission. On the 18th, Prof. Jacob W. Mosher, of the Albany Medical College, was placed in charge of the Albany district as Assistant Commissioner, with Mr. John Phillips as his assistant, at the drove yards; Dr. Moreau Morris, Sanitary Inspector of the Metropolitan Board of Health, was appointed Assistant Commissioner for the Metropolitan district, with instructions and authority to act as such along all the lines of travel leading to the city; and Dr. William Manlius Smith of Onondaga, was dispatched to Suspension Bridge, to prevent the introduction of diseased cattle through the province of Ontario, *via* the Great Western railway from Detroit and the Western States.

The city of Buffalo being cared for by its Board of Health, the stock yards were, temporarily, placed under its health officer, and the stations of Dunkirk and Jamestown provided for until they could be visited by the Commissioners.

A brief code of instructions, regulating the inspection of cattle at the stock yards, the transit of cattle through the State, the disinfection of cars, and quarantine of diseased animals, was drawn up by the Commission, and published generally throughout the State within the next three days. (A copy marked "A" is hereto appended.)

INSPECTION OF THE DEPOT, ETC., BY THE COMMISSIONERS.

On the 19th of August, the Commissioners separated, and made, each, a rapid survey of his own district, Commissioner Allen taking the Western, Gould the Eastern, and Patrick the Central district of the State, while Dr. John Swinburne, Health Officer of the Port of New York, was instructed by His Excellency to join

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the Commissioners in making a tour of the State, that his knowledge of the principles of quarantine might be made available in carrying out the regulations already published.

THE STOCK YARDS AT CAMPVILLE.

At Campville, on the Erie road, the disease had first appeared on the 9th of August, some eighteen or twenty head of Western cattle, taken from the cars on the previous day, having died within a few hours. They were buried in shallow trenches near the river, and into these same trenches, shortly after, were thrown the mangled remains of a large number of cattle, the debris of a railroad smash-up, some distance east of Campville.

Only a few inches of soil was thrown into the trenches, not even covering the animals from sight, and the weather being extremely hot, such a stench arose from that mass of corruption as threatened a pestilence, when Messrs. Swinburne and Patrick reached there on the morning of the 21st of August. They were soon after joined by Dr. J. G. Orton, of Binghamton, who had been previously directed by Gov. Fenton to visit that station, and who was immediately placed in charge of the district as Assistant Commissioner, with E. Van Tuyl as his assistant, at the Campville stock yards.

Under Dr. Orton's directions, the trenches were promptly covered with lime, and then with a heavy covering of earth, well sprinkled with carbolic acid, as found in the heavy oil of coal tar. All the yards, lanes and platforms about the premises were thoroughly disinfected by the use of the heavy oil.

The result of this process was almost instantaneous and perfect; no offensive effluvia afterwards arose, and no case of disease has since appeared.

ELMIRA.

At Elmira, arrangements were made with Drs. Way, Squires and Chubbuck, city physicians, to act temporarily in case the disease should appear at that place, and Mr. G. E. Carpenter was appointed Assistant Commissioner for the district. As no case of Texas cattle disease has shown itself in that neighborhood, these gentlemen have not been called into service.

MEETING OF THE COMMISSIONERS AT BUFFALO.

By the night of the 22d (Saturday), the Commissioners were all gathered at Buffalo, Dr. Swinburne being with them. The mayor of the city, Gen. W. F. Rogers, the Board of Health, the railroad

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officers, and many prominent citizens of Buffalo, took an active interest in the business of the Commission, and by the 24th (Monday) a system of inspections, quarantine and disinfection had been perfected and put under the control of Dr. E. E. Mackay, Health Officer of the city, who was appointed Assistant Commissioner, with D. M. Josslyn as his assistant, at the extensive stock yards of the Central railroad.

As Buffalo is the principal gateway through which cattle enter the State from the West, and vast numbers are being landed there continually, rendering it necessary that a very rigid control should be exercised at that point, Commissioner Allen was specially charged with the supervision of that important depot.

SUSPENSION BRIDGE.

The Canadian authorities having, by an order of his Excelleney the Governor-General, in Council, prohibited the introduction of horned cattle from the United States into the Provinces of Quebec and Ontario, all danger of infection from the transportation of Western cattle over the Great Western railway, ceased, and Dr. Wm. M. Smith was withdrawn from Suspension Bridge, to take the place of medical adviser to the Commission, Dr. Swinburne being compelled, by his official duties as Health Officer of the Port, to return to New York.

DUNKIRK.

On the 25th, the Commission proceeded to Dunkirk, the western terminus of the Erie road, and there established such quarantine, inspection, and other regulations as appeared needful, appointing A. H. Abell, Esq. Assistant Commissioner, with Dr. Benedict as medical adviser, if his services should at any time be deemed necessary.

ERIE.

As no system of inspections, quarantine, or other regulations in regard to diseased cattle had yet been promulgated in Pennsylvania, at the request of the Lake Shore railroad officers, the Commissioners extended their observations as far west as Erie, where they had an interview with Mr. Luce, the transportation agent of the Lake Shore road at that place. After a full understanding of the objects of the Commission, and an examination of the instructions and regulations issued to its own inspectors, Mr. Luce decided to adopt, as far as practicable, the same system at Erie; thus prac-

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tically extending our own quarantine regulations some twenty-five miles beyond the limits of our own State.

JAMESTOWN.

As the Atlantic and Great Western railway, connecting with the Erie railway at Salamanca, affords a fourth gateway for cattle to enter the State from the West, the Commission visited Jamestown, and there established the same system of inspections, quarantine, etc., as at Dunkirk, and appointed Sardius Stewart, Esq., Assistant Commissioner for the Jamestown district.

Having thus established a system of inspection at every point where Western cattle enter the State, the Commission returned to Buffalo on the evening of the 27th of August, where they found several cattle in hospital yards, and had an opportunity to study the disease itself more fully than heretofore; for up to that time very few *facts* had been gathered as to its real nature.

THEORIES IN REGARD TO THE DISEASE.

Great numbers of Western drovers and stock dealers were examined as to their knowledge of its character and effects, resulting in the enunciation of a multitude of theories, prominent among which were:

1. That no Texas cattle had ever been known to die, or be affected with the disease themselves, but were universally regarded as sound and healthy.

2. That by some mysterious agency, these healthy Texas cattle had, at various times within the last few years, infected the native cattle of the Western States with a fatal disease.

3. That native cattle, though sick and dying of the disease, could not impart it to other cattle.

4. That the meat of diseased animals had never been known to produce any ill results to the consumer, and might, therefore, be regarded as healthy food.

5. That with the first frosts of autumn, the disease entirely disappeared, and no infection could be conveyed thereafter by Texas cattle.

The facts, however, that came under the observation of the Commissioners, led them to discard these theories, though without, then, arriving at conclusions entirely satisfactory to themselves on the subject; and on the 28th of August they adjourned, to meet again in New York city, on the 2d of September, there to make more thorough and accurate investigations.

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MEETING OF THE COMMISSIONERS IN NEW YORK CITY.

Accordingly, on the 2d of September, Messrs. Patrick and Gould, with Dr. William Manlius Smith, met in New York, and were joined by Dr. Swinburne, Health Officer of the Port, Dr. Harris, Registrar of Vital Statistics of the Metropolitan Board of Health, and Dr. Moreau Morris, its Sanitary Inspector and Assistant Commissioner for the district. In consequence of the large number of cattle arriving at Buffalo, it was not deemed safe for Mr. Allen to leave that most exposed position, at that time, and the other members of the Commission were obliged to go on without him.

Under the guidance of the officers of the Board of Health, a thorough survey of the whole field of operations was instituted, extending beyond the city limits and across the Hudson to the stock yards and abattoirs on the Jersey side, which furnish meats to the New York markets. The "bone boiling" and "rendering" establishments were visited, to follow up condemned meats, and ascertain the final disposition made of them, as well as to become familiar with the various processes of disinfection in use at those places, where carcases of dead animals, in every stage of putrefaction, were gathered from every part of the city.

METROPOLITAN BOARD OF HEALTH INSTITUTES INVESTIGATIONS.

Autopsies of animals dying of the Texas disease, were made by the officers of the Board of Health, at the drove yards of the Messrs. Allerton, and the results of these examinations recorded. A careful analysis of the various tissues, fluids and viscera of the animals was conducted by Prof. Chandler, of the School of Mines, Columbia College, Chemist of the Board, while the same structures were subjected to the scrutiny of Prof. Stiles, of Brooklyn, Microscopist of the Board. Bringing his skill and large experience to the work, Prof. Stiles soon unmasked the mysterious and active agent in this disease, revealing not only its perfect outline and form, under the microscope, to every eye, but, with equal distinctness, exhibiting the mode of its attack upon the blood discs, and the entire destruction of the blood that resulted from it. One of the most brilliant discoveries in medical science, but not more brilliant than useful.

RESULTS OF OBSERVATIONS.

As the result of their observations in New York, the Commission drew up the paper marked "B" (appended hereto), and caused it to be published in the leading papers throughout the State.

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Notwithstanding the utmost caution and watchfulness at Buffalo, and other places of inspection, diseased cattle often reached New York city, until quite late in the season, and the Commissioners were frequently called to look at cattle in different localities, and affected with various ailments, but which, in the excited state of the public mind, were supposed to be cases of real Texas disease.

WESTERN COMMISSIONERS SENT TO NEW YORK.

As was expected, the inspection and quarantine regulations established at Buffalo, and other railway depots, created great consternation in the Western cattle dealing States, and caused His Excellency Governor Oglesby, of Illinois, to appoint a special commission with instructions to visit New York, for the purpose of conferring with Gevernor Fenton and the New York Commission, as to the best means of regulating the shipment of cattle to Eastern markets, so as to embarrass the trade as little as possible, while protecting the health of our citizens and guarding their herds from infection. (See paper marked "C," hereto appended.)

An examination of the workings of the system adopted in this State, proved satisfactory to the Illinois Commissioners, and a request was made by them, that a call should be issued by the Governor of the State of New York, for a convention of commissioners from all the States interested in breeding, feeding, handling and shipping cattle, as well as from the Eastern consuming States, where cattle are marketed.

CALL FOR A CONVENTION OF CATTLE COMMISSIONERS.

In this request Illinois was joined by other Western States and Canada; resulting in the issue of a circular from the Executive Chamber in Albany, calling such convention to meet at the city of Springfield, Illinois, on the 1st day of December, 1868. (See paper marked "E.")

As the subjects to be discussed in that Convention involved questions of vital importance to the citizens of this State, it was essential that this Commission should be thoroughly prepared to meet them understandingly, and be able to bring *facts* before the convention, in opposition to the interested statements of dealers in Texas cattle, and the numberless theories set afloat in regard to the character and effects of the disease, by persons who had never thoroughly investigated the subject.

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NEW YORK STATE COMMISSIONERS AND METROPOLITAN BOARD OF HEALTH.

Accordingly, after having met and conferred with the commissioners of the Province of Ontario, who had but just returned from an extended tour of observation in the West, the New York Commissioners assembled at the rooms of the Metropolitan Board of Health, in the city of New York, on the 2d day of November, and were permitted to avail themselves of the results derived from all the scientific investigations that had been going on since the 8th of August, as well as all the data gathered by Dr. Harris, the Registrar of the Board, in the course of his widely extended correspondence, and the mass of facts gathered by Assistant-Commissioner Morris and his associate inspectors of the Board of Health, during the prevalence of the disease.

Every stock yard, abattoir, slaughter house, rendering and bone-boiling establishment of the Metropolitan district, was made the subject of investigation, and all classes of disease affecting ruminants (and to some extent swine), came under the observation of the Commission, revealing such an amount of reckless barbarity towards animals, and of criminal indifference to the public health, on the part of many who furnish meat to consumers, that one almost wonders how the city has escaped a pestilence.

It is to be hoped that some of these terrible nuisances will soon be abated by law, and that all animals for slaughter will be taken to the great abattoirs of Communipaw, East Forty-fourth street, and the like, where the meat can be inspected by a proper officer, and everything condemned, be conveyed speedily to such rendering dock as that of West Thirty-eighth street, where steam and carbolic acid effectually destroy all offensive odors.

DR. MORRIS TO REPRESENT THE METROPOLITAN BOARD OF HEALTH AT SPRINGFIELD CONVENTION.

As it was of much importance that some competent medical gentleman, who had been personally acquainted with the disease as it developed in New York, should be present at the Convention in Springfield, the Board of Health very kindly authorized its Sanitary Inspector (and our Assistant Commissioner), Dr. Moreau Morris, who, more perhaps than any other individual in the city, had come in contact with infected and diseased cattle, to accompany the State Commissioners to the Convention.

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TEXAS DISEASE IN ORANGE COUNTY.

A question of great interest in connection with the spread of this infection, had been settled, by facts, only the week previous to the meeting of the Commission in New York. On the 20th of October, Commissioner Gould had been called to Hamptonburgh, in the milk district of Orange county, to ascertain the cause of a number of sudden deaths among cattle in that neighborhood. Dr. Morris was eventually summoned from New York, and on the 24th October, with Mr. Gould and Dr. Montfort, Assistant Commissioner, made post mortem examinations of two heifers, found dead on that day, and these were followed by the post mortem examination of a cow on the 27th, by Dr. Montfort. From all the facts elicited during these investigations, and from the autopsies of the animals, not a doubt was left on the minds of these gentlemen that they had died of genuine Texas cattle disease; and further, that this disease had been introduced into that neighborhood by a herd of *native cows* brought from Painesville, Ohio, on the Lake Shore railroad, over which large numbers of Texas cattle had been passing. (Commissioner Gould's instructions to farmers, marked "E," are hereto annexed.)

As it had been almost universally assumed in the West, that *Texas cattle, only*, could communicate the disease, an important question was settled at Hamptonburgh.

AUTOPSIES OF TEXAS BULLOCKS AT BUFFALO.

Again: It had been announced by stock dealers as an undeniable fact; that, although Texas cattle might give the disease to native cattle, they were never affected by it themselves. Yet at Buffalo, on the 24th of November, the Commissioners found two Texas steers (taken on the previous day from a herd directly from Kansas) in a dying condition; and, on being slaughtered, presented every characteristic feature of the genuine Texas cattle disease in its most intensified form; and this, too, in very cold weather, after nearly two months of frost—establishing beyond all cavil the fact, that Texas cattle may die of the disease, and that, in freezing cold weather.

A TEXAS HERD AT LAFAYETTE, INDIANA.

While on their way to Springfield, the Commissioners sought information from all sources; and at Lafayette, Indiana, spent a day in the slaughtering establishment of Sample & Son, where a herd of one hundred and forty-two Texas cattle were being slaughtered

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for packing. These animals appeared to be in perfect health, presenting no external symptoms of any disease, and the meat, except in a single instance, appeared to be of good quality; yet the viscera of large numbers of these animals, taken indiscriminately from the herd, exhibited in *every instance* the unmistakable scars which that disease invariably leaves upon the coats of the stomach.

So evident did it appear to the Commission, that Texas cattle, as a class, were all, more or less, at some time, affected by this peculiar disease, which invariably left upon the coats of the stomach an ineffaceable and characteristic mark, that Texas cattle dealers in Springfield were permitted to select one of the best Texas bullocks, from the best Texas herd of the season, and have it slaughtered, to test the question.

EXAMINATION OF THE STOMACHS OF A TEXAS STEER AND NATIVE COW, AT SPRINGFIELD, ILL.

On the morning of the 1st of December, in the presence of a large number of gentlemen of the Convention, and cattle men generally, the selected animal was slaughtered, and presented such palpable evidences of former disease, as to convince the most skeptical. To meet the assertion, "that all animals grazed on Western prairies, presented the same appearance of scars upon the stomach," a fat native cow was knocked down, and, on being opened, the stomach exhibited a perfectly smooth, clean and healthy appearance, entirely different from that of the Texas animal lying by its side.

The record of disease written upon the viscera of the Texas animals, so distinct and perfect as to be seen of all men, had much influence in settling the opinions of Commissioners who had already assembled from most of the States; so that, when the Convention organized, much useless debate upon exploded theories was avoided.

MEETING OF THE CONVENTION.

The convention met in the Hall of Representatives at 12 M., on Tuesday, the 1st day of December, and proceeded to business. Hon. Lewis F. Allen, of the New York Commission, was chosen President of the Convention, which continued its sitting until Thursday, the 3d, when it adjourned.

As a very full copy of its proceedings are published under the direction of His Excellency Governor Oglesby, it will not be necessary in this Report to speak of them in detail.

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A mass of facts and general information in regard to the cattle trade of the West were elicited during the discussions, which were of great value to the New York Commission, and those from States on the Eastern seaboard.

The results of the series of investigations conducted by the Metropolitan Board of Health, were presented to the Convention by Dr. Morris, and attracted marked attention; especially certain plates and drawings illustrating the appearance of diseased matter under the microscope, and the various developments of cryptogamic growth in the blood and other fluids of diseased animals.

RESOLUTIONS.

Resolutions were adopted by the Convention, recommending to the Legislatures of the several States interested, the enactment of uniform laws, regulating the times for introducing Texas cattle into their respective States; the driving, shipping, feeding and transportation of cattle designed for market; instituting a system of inspection along the routes of cattle transit, and providing suitable penalties for persons diffusing dangerous diseases from animals in their possession.

MEMORIAL TO CONGRESS.

The convention also appointed a committee to present a memorial to Congress, asking for a small appropriation, to be expended under the direction of the War Department, in following up the disease to the pastures of Texas, and with the data obtained already, identify the fungus parasite which is always found associated with the disease, and is the probable cause of it.

It is believed by your Commissioners, that with the knowledge already possessed by the scientific corps of the army, of the Flora and Fauna of the regions traversed by the Texas herds, and with the facilities they possess for carrying out these investigations, the object can be far more speedily, thoroughly, and economically effected, than by the appointment of a civil commission, which must, after all, be largely dependent upon the War Department for assistance and protection.

VISIT QUINCY AND ST. LOUIS.

It was, in part, to gain an opportunity of conferring with the the Lieutenant General, and other officers of the army, on this subject, that the Commission, on leaving Springfield, accepted an invitation from the Missouri delegation to visit St. Louis. Since

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meeting the army officers at St. Louis, no doubt is left in the minds of the Commissioners as to the success of an investigation conducted under the direction of the War Department.

Another, and the main object of the Commission in extending their trip to the Mississippi, was, to gain from personal observation and reliable data, correct information in regard to the magnitude of the Western cattle trade, and the *modus operandi* of feeding, handling and shipping cattle, as well as their treatment *en route* for Eastern markets. At Quincy, much interesting information was obtained.

At St. Louis, through the kindness of gentlemen connected with the Board of Trade and the Board of Health, as well as of other business gentlemen of the city, the Commission had access to all the feeding grounds, stock yards, slaughtering establishments, packing houses and sale yards of the city and suburbs, and were furnished with a mass of statistics, of an exceedingly valuable character, as illustrating this trade.

EXTENT AND DEVELOPMENT OF THE CATTLE TRADE.

Formerly, say fifty years ago, the States east of the Alleghany mountains reared the meats consumed by their own population. They also reared and fatted much for exportation. As our foreign and internal commerce increased, and manufactures of various kinds sprung into existence, the soil was needed for the necessary production of grains, roots, fruits and other human edibles. The new States of the West increased in their herds of cattle, sheep and swine. They were driven on foot over the mountains, and found ready markets in those States which could no longer be supplied from their own soils.

For many years past meat-growing in the seaboard States, has become unprofitable, and our almost sole dependence for that indispensable article is now from the broad grass and corn-growing regions south and west of our great lakes, and extending even beyond the Mississippi.

The amount of our consumption is astonishingly large. New York city and its immediate vicinity now consume, directly and indirectly, about 7,000 beef cattle weekly, making an aggregate of more than 350,000 per year, valued at present prices at about $35,000,000. In addition to these, about 65,000 calves arrive in the city, which may be valued at eight dollars each, amounting to $520.000; about 700,000 swine, worth $10,000,000, and 1,200,000 sheep, worth $5,000,000, amounting in the aggregate, striking off

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fractions, to the round sum of fifty millions of dollars. All this is aside from the vast quantities of salted meats of beef and pork, which are also brought in and consumed in their cured conditions.

A great majority of these live stock enter the State of New York by the railroads from Western States leading to Suspension Bridge at the Niagara river, and Buffalo, and by the Atlantic and Great Western road through Jamestown, in the county of Chautauqua, which connects with the Erie railway at Salamanca, in the county of Cattaraugus. The Erie railway also receives many at Dunkirk, in the county of Chautauqua, from the Lake Shore road, and also at Buffalo, whence they are directly transported to New York. The cattle arriving at Suspension Bridge and at Buffalo, are transported over the Central railroad direct to Albany. Then a portion of them are distributed over various railways into New England, but the bulk of them are shipped over the Hudson river and Harlem roads direct to New York, their final destination. A very considerable number of cattle are also shipped from the Western States by the way of Pittsburg, through Pennsylvania and New Jersey, and arrive at Jersey City and the Communipaw cattle yards, opposite New York, and make a portion of the consumption of the city and its environs.

The journeys which these cattle make, according to the locality from which they are removed, occupy a distance of eight hundred to fifteen hundred miles by direct railway communication, taking from six to fifteen days in the time of transit, with the stoppages for feeding, water, and rest included. The cattle trains move at the rate of about two hundred to three hundred miles in twenty-four hours; but frequently from detentions, delays, and unavoidable accidents, they are delayed between their proper feeding places to thirty, or even forty hours. At an average, the feeding stations, where they can be taken out and fed, rested and watered, may be about two hundred and fifty to three hundred miles apart, but governed some what by the intersections and connections of different nt roads, as they diverge from or come into a main line running eastward, which embrace the traffic.

WHERE OUR BEEF CATTLE COME FROM.

The sources of supply previous to the last three or four years have been principally from the States west of the Alleghany mountains and north of the Ohio river, with the exception of a considerable number from Kentucky and Missouri. They are composed of native stock mainly, with more or less admixtures of foreign blood,

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chiefly of the short horn breed many years ago introduced into our country from England, and to some extent, other improved English varieties, all which have improved the quality and value of our native herds. These cattle have usually been healthy, both in their native localities, and on their way to and arrival at our markets.

Their usual condition, on their native feeding grounds, and in their various homes, on their removals for grazing and fattening (for they are a commodity of frequent sale and purchase among the breeders, graziers and feeders, who fit them in various stages for market), is generally healthy. Their pastures are good, and their feed usually abundant. Of consequence, when kept from adverse influences by local disease, which is quite unfrequent, they are in good condition when starting for market. No diseases prejudical to their flesh, or adverse to affording good meats to the consumer, have affected them, as a rule, when properly and honestly handled, and our people have eaten freely of their flesh without fear of evil consequences.

THE TEXAN CATTLE.

But another and a widely different source of supply, within the last eight or ten years, has opened. For a very few years previous to the late civil war, some droves of cattle were brought into South-western Missouri, which found their way through the Indian territory west of the State of Arkansas. They were comparatively few in number, and attracted little attention, other than that they were known to bring with them a peculiar local disease, which, under certain circumstances of exposure, hardship and abusive driving, they imparted to the native cattle of that then far distant region of Missouri.

The rebellion at the South put an end, temporarily to that recently opened traffic, and from that prolific source of supply the Southern armies were mainly fed while they held possession of portions of the lower Mississippi; and when the Northern armies gained possession, the outlet for them being cut off, and no hostile invasion occurring in that distant State, their herds increased in great numbers.

WHAT ARE TEXAN CATTLE?

They are the descendants of the Spanish herds introduced into Mexico in the sixteenth century, soon after the conquest of that country by the Spaniards. In that country of wide savannas and abounding herbage, with continuous green foliage throughout the year, they increased, multiplied and spread over the wide territory

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with a fecundity unparalleled in all previous histories of their race. Every Mexican State and appendage where settlements prevailed, whether occupied by Spaniard or Indian, were ranged over and grazed by these numerous herds. They composed the chief wealth of the sparsely settled population, and were mainly valued for their hides and tallow, which became large articles of export. Their flesh was a secondary object, and of little value. Texas, when admitted into the United States, was full of them, and they soon became the chief sources of beef supply to New Orleans and the other cities and towns on the Gulf and Lower Mississippi.

CHARACTER AND PROPERTIES OF TEXAN CATTLE.

In stature, they are medium, coarse and sleazily built, with large bone and horn; they are but moderately fleshed, and that flesh, in its natural wild condition, when compared with our own good native beef, is coarse, flabby and stringy. Savage and semi-wild in habit, they come into domestication reluctantly; yet, in many instances, when well tended and fed on our best pastures, and "finished off" on corn, after the manner of our good graziers and feeders, they yield a passable carcass of beef, but at more expense of food than those reared and fed in our own States. They mature tardily, at a not less age than five, six, or seven years, and at such ages, their live weight, in good condition, ranges from nine to twelve hundred pounds when brought to market.

THEIR MODE OF REARING AND TREATMENT.

They are owned in Texas, in large herds, ranging from a hundred to several thousand, in the hands of a single individual. No fenced pastures enclose them, and they range over the country in multitudinous droves, for many miles away from their owners' localities, all sexes and ages running together. One man may own a thousand head or more, and his only personal property aside from them, may be a few semi-wild horses, a little household tackle, his shooting and cutting irons, and a raw-hide tent, or log cabin, where he lives and rears his family.

Running wild, the cows drop their calves at all seasons of the year, and rear them as best they may, in their own wild and vagrant manner. At a certain season annually, the several owners turn out, hunt, and collect their cattle from their various ranging grounds and drive them into enclosures made for the purpose—each one of a year old and upward having the brand or mark of their owner

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upon them. Here the calves are selected and branded with their several owners' marks, or initials, the males castrated, those selected for driving away and selling taken out and retained, and the rest turned out again for grazing. Such is their rearing and treatment.

DRIVING, TRANSPORTATION, AND SELLING.

When collecting for sale and a market, those selected and fit for the purpose, mostly steers and cows, are separated from the main herds (each owner knowing his own brand—and it is but justice to say that they are scrupulous in acknowledging among each other that mark of ownership), and strictly guarded by the drovers from getting back into the main herds. When ready for a start, they are then hurried out from their accustomed ranges into new grounds on their way to market. In many cases they are inhumanly driven, without sufficient food or water.

WHEN INTENDED TO GO ON SHIPBOARD.

On arriving at the landing places of the steamboats on the Gulf, or Mississippi and its tributary waters, they are rushed on to boats in the most brutal manner. When refusing, by fright or terror, to go on board quietly, they are lassoed by the horns, necks, or legs, as chance or opportunity may offer, and hauled on the decks, where they are crowded into the closest possible space, and securely railed in from escape. There the poor suffering beasts remain, tortured by hunger and thirst for several days together, with nothing to eat and no opportunily to drink, from their huddled condition, although a sea of water may be all around them, until they are taken to their destination on the rivers several hundred miles above, or below, and landed.

Those destined for immediate slaughter in the lower cities, on landing go immediately to the slaughter houses, or may be fed for a few days in yards until marketed. Those intended for grazing in Eastern Missouri, Kentucky, Iowa, or Illinois, go to the readiest landings on the Mississippi, or Ohio, and are there taken off and driven, or put in railway cars for transportation to the interior. We have been told on credible authority, that as many as eleven hundred head had been crowded and transported on a single steamboat to St. Louis, and perhaps nearly equal numbers on a single boat to Cairo, at the mouth of the Ohio. In this wretched condition at landing, many of them are found dead; others are terribly bruised and mutilated from crowding, and getting down and trampled upon

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by the others while on the boat—so much so as to be thrown overboard, or put aside from driving, or car transportation at all. Those able to be put on the cars are then, without food, in many instances, transported two hundred and twenty-eight miles—sometimes occupying two or three days on the journey, without food or water—to Tolono, the principal distributing point, where they are disembarked from the cars, and driven to their feeding or pasturing grounds.

To say that these poor, abused, emaciated cattle, having lived for a week, or ten or twelve days, without food or water, or with so trifling an amount of either, as only to tantalize their existence into the desperation of misery and torture, with their systems relaxed almost to a state of collapse, can be healthy, is to assert a fact utterly inconsistent with the laws of either health or animal physiology. The normal causes of disease—elsewhere discussed—existing within them, become active, and, when ranging with the native cattle with which they come in contact, they impart the disease to them, or leave it by the *spores* of their excrements on the cars and on the roads, in the streams, or the pastures and grasses over which they pass, to be imbibed or drawn in by the animals which follow them. Such is the condition and treatment of a large proportion of the Texan cattle which come into the upper States by boat transportation on the Mississippi.

INLAND MOVEMENTS OF THE TEXAN CATTLE.

Gathered into their several herds for driving northward, from the central portions of Texas, they are rapidly hurried forward, sometimes, as we are informed, at the rate of more than forty miles a day on their first starting—they are driven through Upper Texas and across the Indian territory west of the State of Arkansas, grazing on the open prairies and wooded ranges by the way, into Kansas, to a station called Abilene, in the central part of Kansas, one hundred and sixty-three miles west of Leavenworth. The journey to Abilene may be from five hundred to eight hundred miles, according to the parts of Texas from which they first started. Abilene is now the great point of arrival for the cattle from the interior of Texas. Here have recently been built large yard accommodations for their collection, sale and purchase as they arrive; and immense numbers, sometimes as high as twenty-five to fifty thousand in number, are pastured and herded in the vicinity, awaiting a market. Here they are bought by the large cattle dealers of the States east, and driven or "carred" forward to their

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various points of destination for feeding. They usually arrive at Abilene in a moderate condition of flesh—some better, or worse than others, as they have been driven, fed and watered by the way. They remain in the vicinity of Abilene sometimes for weeks and months, as purchasers may arrive from the East, or as the condition of the cattle may need recruiting for sale. As the land is mostly prairie, with abundant grasses growing, and mainly unsettled, pasturage costs little or nothing. They only require herding, which is cheaply done by their owners.

These cattle are bought in Texas for six to eight dollars a head, and their entire cost on arriving at Abilene does not exceed ten to twelve dollars each, thus establishing the foundation for

"CHEAP BEEF."

Here lies the solution of the grand question, why such comparatively inferior animals as the Texan cattle have been introduced into the wide cattle breeding and grazing regions of our Northwestern States. That they are "cheap," in every signification of the word, is certain. They bring the same *seeds* of disease with them to Abilene, as do the more southern herds which come up the river to Cairo and St. Louis, and under like circumstances impart it as readily to our native stock as they.* But allowing that quite a percentage of them die by abuse, and their own native disease, still, the wide margin of the whole cost left on the survivors, below the values of the native cattle of the Northwestern States, gives the "handlers" of them a large profit.

The losses suffered by the owners of native stock, which the Texan cattle have imparted to them, have been very heavy, and could they be thrown upon the owners of the Texans, the question of "cheapness" in their original cost, and the expense of "handling" them, might prove altogether a different matter.

What the proportionate number of Texan cattle, which reach our markets, may be to the natives, is difficult to say; and how much their considerable numbers may reduce the prices of beef at our seaboard cities, if they were not available, is simply a matter of conjecture.

There are two distinct parties to the policy of using Texan cattle. It can be proved, by credible witnesses, among the graziers and drov-

* It is, perhaps, proper to say that, from all the recent evidence gathered by the Commission, there can be no doubt that a much larger proportion of those Texas animals that come north by the Cairo and Mississippi route, are badly diseased, than of those which are brought by the Kansas and Abilene route.

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ers, in a court of justice, that the Texans are a profitable, useful and valuable class of beef-making material to our Western graziers and farmers; and it can be equally well proved by other witnesses, in the same occupation, that they are a scourge and a curse to the country, and that it is a calamity that they were ever introduced, and will remain a calamity so long as they are suffered to enter our States.

These are questions which we need not argue. They who purchase, feed and handle them, say their flesh is good, palatable and healthy to the consumer. When it is conceded by good physiologists that a coarse, raw-boned and streaked fleshed, six or seven years old beast of any kind, is equal in tenderness, juiceness, flavor and nutritive quality to a well constituted, small-boned, nicely fattened one of three or four years, and the general sentiment of the beef-consuming population concur in it, the question will be settled in favor of the Texans, and we fancy not until then. The fact of disease existing among the Texans, left out, would do much in their favor. But that fact admitted, sound policy, and a due regard to the sanitary condition of our population, may well interfere with he decision; and the sanitary question is probably the only one with which our State Legislature has a right to interfere.

REGULATIONS ATTENDING THE TRANSPORTATION OF CATTLE IN THE STATE OF NEW YORK.

This is a question, out of our own State, either way, with which we have nothing to do, and can only allude to it as touching our government in the matter. As a *sanitary* measure, we take it that the Legislature has entire control over it. A statement of the facts regarding the cattle transportation through the State will explain.

In the first place, *the great lines of railway running from the western line of the State to Albany and New York, appear to have done and are doing all in their power to accommodate the cattle traffic, both for the public and the owners of stock to the best advantage.* The New York Central railroad, at its cattle station at Suspension Bridge, where it receives stock *via* the Great Western, through Western Canada, or Ontario, from the Michigan Central road, has capacious and excellent yards, with good supplies of forage and water, where cattle and other stock are yarded, fed, watered, rested and shipped into their own cars for Albany.

At Buffalo, this road has also extensive yards of the most commodious character, fenced, paved and sheltered, with abundant provisions of forage and water, where the stock is received from the

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Lake Shore and Canadian Grand Trunk roads, and treated as at Suspension Bridge, and again shipped into their own cars for Albany. We hear of no abuses in the cattle transportation on either branch of this road.

The Erie railway now receives the chief part of its stock for transportation, which comes in over the Lake Shore road, at the yards of the Central road in Buffalo, although we understand it contemplates erecting commodious yards of its own contiguous to the Central yards, on land which it now owns. It also receives a portion of its stock at Dunkirk, the western terminus of the road, and also at Salmanaca, four hundred and fifteen miles west of New York, from the Atlantic and Great Western road. Here, we understand, it takes the stock cars from the latter road, as they arrive, and runs them to Campville, half way the whole distance between Jersey City and Dunkirk, two hundred and thirty miles. At Campville, all their stock are *intended* to be transhipped, fed and watered for the remainder of the journey, although some of it is hurried through without either.

The Atlantic and Great Western road enters the State of New York at its western line, about fifty miles west of Salamanca. How far its stock-feeding place is west of here, we are not informed, but at Jamestown, thirty-four miles west of Salamanca, we learn that portions of its stock are put off the cars, yarded, fed and watered. They are again taken aboard, and proceed to New York by the Erie road, from Salamanca.

The Lake Shore road brings the great bulk of the stock from the West, and delivers it to the Erie and Central roads at Dunkirk and Buffalo, as before stated. Thus it will be seen, that when stock arrives from States west of New York, our own roads are prepared to receive and treat it in a proper manner, and were there no further difficulties connected with the traffic, our people, or Legislature, would have little to do in the matter of regulating the transportation. But stock of all kinds intended for slaughter arrive at our Western cattle yards in all possible conditions and circumstances.

THE DROVERS, CATTLE OWNERS, AND DEALERS.

These are a numerous, and in the aggregate, an active, influential class of men, embodying great business experience, frequently of large wealth, making extensive transactions, handling great amounts of money, and usually fair in their dealings. Their homes are on all the lines of railway, and frequently off from them, extending

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from Maine, and Boston, and New York city, to Kansas. They are alert in movement, quick in bargains, bold in their operations. Their business is usually profitable, but sometimes the reverse. They consider their word as good as their bond, which it should be, as heavy amounts of property frequently change hands among them, with nothing but a slight written memorandum, or a witness called at the moment to attest their bargains. Detected in an unfair or under-hand transaction, they quickly lose cast, and are ruled out of the circle of fair dealing. Many among them, in the chief Wstern cattle States, are large breeders, graziers and feeders of stock, and they embrace bankers, merchants, lawyers, and men of almost every profession connected with the ownership of land and capital. Their individual transactions amount, in the aggregate, from a few thousand to more than a million or more of dollars annually. One cattle dealer, Mr. Alexander, alone, for the year ending May 1st, 1868, sent to New York market about 40,000 cattle. About 9,000 of them were fatted on his own farms, which consist of some 45,000 acres in one body in the county of Champaign, Illinois, and 31,000 head were purchased of other farmers and dealers. The value of these cattle in New York, including cost at home, and transportation, was about $115 each, making in the aggregate, $4,600,500; and his business for the current year will exceed that of the last about twenty per cent. These cattle all, or nearly all, passed over the Pennsylvania and New Jersey railways to Jersey City.

Chicago, Toledo, Buffalo and Albany are the chief way cattle markets on the great routes to New York and the New England States, where dealers and drovers congregate in large numbers for sale and purchase; so that, in frequent cases, cattle change owners two or three times after their first shipment before reaching their final destination.

In justice to a great majority of the drovers, we take pleasure in remarking that they are careful of their stock in transportation, liberate them from the cars at proper points, and care for their health and welfare by food, water and rest, so that they arrive at market in good condition.

Yet, it must also be remarked, there is another class of drovers and dealers, trading chiefly in the inferior and cheaper classes of cattle, who pay little regard to the impulses of humanity, and run their cattle through to market from their distant Western shipping points on the cars, in the most cruel and merciless way, for three,

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five, or even more days and nights together, as the case may be, with little, if any, food, water or rest on the route. In such cases the poor suffering animals become jaded with fatigue, almost famished with hunger and thirst, and lose much flesh. In frequent instances they become diseased, or falling down in the cars and tramped on by the others, arrive in a most pitiable condition of bruises, sometimes broken limbs, and utterly disordered condition. Cattle apparently well at the time of their shipment, or having incipient ailment only, frequently have disease break out among them which is only discovered at the transhipping or car-changing points, when they are unable to go further. At these points, usually Chicago, Buffalo or Albany, a class of "shyster" butchers congregate on the chief cattle-arriving days, who buy these maimed, bruised and diseased animals, drive them slyly away, slaughter, and cut them up, taking out the bruised or diseased parts, and sell them in the meat markets and stalls to the unwary and unsuspecting, who are ignorant of what they buy, only looking at *cheapness* in the price. Such meat *must* be diseased, and unwholesome.

Nothing short of stringent laws for the inspection and condemnation of such cattle will correct this dishonest traffic, and save the community from the bad effects of consuming such unhealthy food. *Sanitary* protection of the community in our cities demands it. The numerous instances of such traffic which have come to the eyes and ears of the Commissioners, compel them to expose these glaring impositions, which from small beginnings have now become so frequent as to demand the action of the Legislature to enact strong and positive laws for the protection of the people from further impositions of the kind.

To follow this *cheap* and unwholesome trade, the Texan and the inferior classes of our own native stock offer the greatest inducements for unscrupulous men. The poorer classes in our cities clamor for *cheap* meats, and as these kinds of stock are offered to them comparatively low *in price*—but in reality the dearest, when the amount of bone, gristle, and offal is considered, and which they do not consider—the imposition upon them is cruel and inhuman.

Yet the Texan cattle are not altogether of the class abovenamed. Many of them, when well wintered in the Western States, with good summer pasture, and corn feeding following, produce good and healthy and palatable beef, even with the signs of their native previous disease lying latent within them. But, with the over-driven, jaded and abused ones, the disease is liable at any time to

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break out, and communicate to other healthy ones with which they come in contact and association; or, they may leave it in the cars in which they are transported, in the streams or pools from which they drink, the pastures on which they graze, or on the roads over which they are driven.

SHEEP AND SWINE.

The abuses which have been recounted in regard to cattle, also appertain to sheep and swine, but not to an equal extent. They equally require inspection, and condemnation if necessary, at the cattle yards and shipping points, as well as rest, food, and water. Large numbers of diseased, maimed and bruised ones are bought, slaughtered and sold in the markets, and consumed by the unsuspecting buyers of cheap meats, quite as deleterious to their health as the bad beef, and in this disposition, the buyers and consumers require equal protection from their bad effects.

REGULATION OF STOCK TRANSPORTATION.

From the attentive observation which the Commissioners have been able to make, and the various information they have obtained, they are satisfied that laws regulating the transportation of live stock to market, should embrace—

1. A careful and thorough inspection of all stock on their arrival at the transhipping yards in the State.

2. The selection and condemnation of all diseased, maimed and dangerously bruised animals, which, if unable to be immediately removed into quarantine, or driven into the country, out of the way of healthy animals, should be immediately taken to rendering houses, and their carcases summarily disposed of.

3. A rest to the stock of full twenty-four hours, in which they have sufficient wholesome food and water.

4. That they should not remain on the cars a longer time than twenty-eight hours (barring unavoidable delays and accidents to the progress of the cars), and that their passage between Suspension Bridge or Buffalo and Albany, should not exceed that length of time. At the latter place they should be again unloaded for food, and rest twenty-four hours before shipped to New York.

5. Stock passing by the Erie road, or coming in by the Atlantic and Great Western road, should be unloaded at Campville, and there fed, watered and rested as at Buffalo, before proceeding to Jersey City or New York. And in the latter place they should, on their

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arrival at the yards, be fed and watered, unless they proceed immediately to the slaughter yards; and also that power be given to the State Commissioners to make any other, or additional regulations, which the necessity of the case may demand.

OBJECTIONS TO THESE LAWS.

It may be complained on the part of some of the drovers and dealers that such rules may be too stringent; that it will bear hard on those who have invested heavy sums in the purchase of their stock; that they are unnecessarily kept out of a return of their money; that a rising or a falling market may seriously affect such delay, and prove greatly disadvantageous to their interests.

In some instances it may be so; but is not the health and welfare of the people who consume their stock to be equally considered? Animals pushed with such headlong speed through from their first shipment to market, lose much flesh and weight—an average of quite one hundred or more pounds per head—and the tissues of their entire system are turned into a feeble, disordered and feverish condition, to say nothing of such barbarous and inhuman treatment to the poor brutes themselves. And this treatment is oftentimes greatly aggravated by the merciless beating, punching with iron-sharpened goads, and maltreatment they receive in their "handling" by some of the drovers and their attendants.

Again, there are great numbers of first class cattle, sheep and swine, well fattened, of large size and heavy weights, which must, of necessity, be shipped and transported with care. They are valuable. Their owners know it, and are watchful that they be rested, fed and watered at proper times and places. It is for their interest so to do, that their stock may arrive at market in good condition, and bring good prices. They make no complaint of delay, or of losing time and capital in their transportation. "A merciful man is merciful to his beast," and if the owners of inferior stock show less regard to their meaner or cheaper things, they should be compelled, by all considerations of humanity, as well as sanitary law, to comply with like conditions which the owners of better cattle impose upon themselves.

REGULATIONS OF OTHER STATES.

Although it is to be hoped that the several States west and south of us will do their whole duty in this matter, by enacting such laws regulating the stock trade and transportation, as may be needful

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within their own boundaries, the State of New York should, irrespective of their action, do its whole duty to itself and its people. Our population is rapidly increasing. We must receive the bulk of our meats from the West. It is indispensable to the health of that population that these meats should be wholesome and of good quality. It is an imperative duty, so far as the law-making power is concerned, to render them as much so as possible, and the Commissioners would fail in a grave and solemn duty did they not present all the facts and considerations within their power to the consideration of the Legislature.

OBSTACLES IN THE WAY OF INVESTIGATING THE NATURE OF THE DISEASE.

As this peculiar disease had never been known in the Eastern States, and had nowhere been investigated, the Commissioners were greatly embarrassed when its appearance in New York created so much alarm in the month of August last. They were in no condition to institute a series of investigations under their own direction, for their duties called them into every part of the State, and required them to be on the move a large portion of their time.

The small appropriation made for the use of the Commission, under the act of 20th April, 1866, having lapsed (under the two years Constitutional provision), the Commissioners were without funds to pay their personal expenses, much less to call into service such professional gentlemen as were competent to carry forward the work of investigating the disease.

TAKEN UP BY THE METROPOLITAN BOARD OF HEALTH.

By an unlooked for and most fortunate concurrence of circumstances, the Commissioners were relieved from their embarrassment by the action of the Metropolitan Board of Health, which had, at the first outbreak of the disease at Communipaw on the 8th of August, organized a special committee of its medical officers to investigate the nature of this fearful malady.

It will be recollected that at the first meeting of the Commissioners in Albany, on the 18th of August, Dr. Moreau Morris, Sanitary Inspector of the Metropolitan Board of Health (who had been specially charged by that body with the inspection of all cattle arriving in the Metropolitan district), was appointed Assistant Commissioner and clothed with State authority to act along the lines of approach to the city, while the Commissioners themselves were engaged in the other parts of the State.

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LETTER OF DR. HARRIS, REGISTRAR OF VITAL STATISTICS.

Before the Commissioners had left Albany, on the 19th of August, Dr. Harris, Registrar of Vital Statistics, under whose direction the investigations of the Metropolitan Board were being conducted, communicated to the Commissioners the desire of the Metropolitan Board of Health, that the State Commission should assume the conduct of these investigations; but no action could be taken in regard to such proposition, until the Commissioners could be spared from the duties then pressing upon them in the Western parts of the State.

OPERATIONS OF THE SPECIAL COMMITTEE OF THE METROPOLITAN BOARD OF HEALTH.

When the Commissioners finally reached the city of New York on the 2d of September, they found the measures that had been adopted by Dr. Morris under the double authority of the city and State, were so very judicious and salutary in all their results as not only to give entire satisfaction to all concerned, but to render it obvious that this coöperation of the Board of Health and the Commission must continue as begun, and that there must be an entire unity of plans and purposes.

Already the unwearied labors of those gentlemen connected with the Board who were studying the disease, had been crowned with discoveries of an extraordinary character and the acquisition of a large amount of valuable information, not only in relation to the Texas disease, but to Pleuro-pneumonia, also.

PROPOSITION TO TURN OVER THE INVESTIGATIONS TO THE STATE DECLINED.

It was at this time that the medical officers of the Board of Health who were engaged in these investigations, again, and more formally, expressed their wish to wholly relinquish their scientific investigations, and transfer whatever facilities they possessed for carrying them on, to the State officers acting under the special law for preventing the spread of infectious diseases among cattle.

But this proposition the State Commissioners unhesitatingly declined, and earnestly requested that the gentlemen who had commenced these labors in the Metropolitan district, should continue them. It was eminently proper that the thoroughly scientific and devoted medical officers, whose comprehensive and exact researches into the causation and prevention of pestilential and infectious diseases had already commanded the respect of the medical profession,

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and had shown how to apply such knowledge in disarming the most threatening of human pestilences in former years, should conduct and complete, in their own way, their inquiries concerning this cattle disease.

SPECIAL REPORT.

Yielding to the request of this Commission, the investigations of these medical officers of the Board of Health were continued during the remainder of the season, and this Commission herewith submits a body of evidence which the Metropolitan Board of Health has caused to be prepared in the interests of the public health and sanitary knowledge.

Although this evidence constitutes a portion of the report of the Metropolitan Board of Health to the Legislature upon the public health of the Metropolitan district, yet, inasmuch as it also constitutes the most important part of the record concerning the Texas cattle disease as it was developed in the State of New York, this Commission, with the full approval of all concerned, has obtained the use of that "Special Report" to be presented in connection with its own.

It is not necessary for this Commission to add a single word of praise in regard to this "Special Report," as it cannot fail to be appreciated by the State, and by all persons interested in the applications of scientific and sanitary knowledge.

INSUFFICIENCY OF THE ACT OF TWENTIETH APRIL, 1866

As the act of April 20, 1866, under which the Commission has acted, was framed to meet a *foreign* enemy and prevent it from getting a foothold in this State, the Commissioners have found it very difficult to perform the duties demanded of them, in protecting the State from an infectious disease prevailing in the neighboring States from which we are receiving daily supplies of meat for our markets.

To meet such a condition of affairs as has existed in the cattle trade during the last half of the year 1868, and in accordance with the resolutions adopted by the Springfield Convention of Cattle Commissioners, the draft of a law, regulating the trade, transportation and handling of cattle in this State, will be submitted to the Legislature for its consideration.

NO FUNDS TO MEET EXPENSES.

The appropriation of April 20, 1866, having lapsed, as before stated, the Commission was much impeded in its work, just at the time when funds were most needed and the most vigorous mea-

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sures must instantly be taken to check the progress of the disease. After a few weeks, however, an arrangement was effected with the Mechanics' and Farmers' Bank of Albany, under the advice and with the concurrence of His Excellency Governor Fenton and the Comptroller, by which some of the most pressing demands were met.

CHANGES IN THE LAWS ARE SUGGESTED.

By the eleventh section of the act, which now governs the Commission, the expenses of the Assistant Commissioners at the various cattle yards and stock depots throughout the State along the routes of cattle transportation, are to be paid by the counties in which these yards and depots are located, respectively.

To throw such burdens upon the citizens of such counties is manifestty unjust, as they are in no sense responsible for the evils that are introduced by stock *en route* through the State for an Eastern market; nor are the county boards of supervisors proper judges of expenditures ordered by State Commissioners in such an emergency as occurred in August last.

It is earnestly recommended by your Commissioners, that all expenses incurred under the act of April 20, 1866, not already met by the railroad companies and owners of live stock, be assumed by the State, and that the counties of Erie, Chautauqua, Tioga, Albany, Dutchess, Columbia, Orange and New York, be reimbursed for money already paid out, if any, on such account.

ESTIMATED EXPENSE TO THE STATE OF THE TEXAS CATTLE DISEASE IN 1868.

The expenses incurred under the orders of the Commission cannot, at this moment, be stated with certainty, as the accounts have not all been presented, but will not materially vary from the following

Statement.

Expenses in the Albany	district, including Rensselaer...		$4,098 42
do	Tioga	do	162 99
do	Erie	do	930 00
do	Chautauqua	do	276 00
do	Orange	do	194 83
do	Columbia	do	
do	Dutchess	do	3,900 00
do	New York	do	
Total.....			*$9,562 24

* Of this sum there has been paid by the county of Erie already, $345.98; Chautauqua, $150; Orange, $150.

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The Commissioners have drawn from the Mechanics' and Farmers' Bank of Albany, and paid out, for all purposes ($2,230) two thousand two hundred and thirty dollars, of which sum ($400) four hundred dollars was used to defray expenses in the Metropolitan district; making a total cost to the State, when all known demands are paid, of about $11,792.24, for which an appropriation is asked.

Although it is to be hoped that no considerable expenditure will be necessary during the year upon which we have entered, prudence requires that a sufficient fund to meet emergencies be placed at the disposal of the Commission.

CONCLUSION.

In conclusion, the Commission cannot but feel, that though the State has barely escaped a great calamity, the visitation of the Texas cattle disease has not been an unmixed evil.

As direct resultants of investigations connected with this cattle disease, some of the most brilliant and useful discoveries in sanitary science have been achieved. Pleuro-pneumonia has been successfully treated, and a remedial agent of incalculable value has been brought into common use among the herds and flocks of the State.

With reasonable care on the part of stock owners in keeping themselves supplied with carbolic acid in some one or more of its forms and using it freely on their premises, there appears to be a perfect immunity from diseases that have, hitherto, carried inevitable destruction wherever they appeared.

Further than this, the observations of the Commission warrant the belief that this same agent possesses curative properties of the greatest value when applied to "foot rot" in sheep.

From the fact that carbolic acid acts specifically upon all germs, or seeds of disease that are propagated in a manner similar to the spores, or fungus parasites of the Texas disease, it is not too much to hope that it may be used successfully in the treatment of many diseases in animals heretofore regarded as incurable, especially the Glanders in horses; inasmuch as the recent researches of the world-renowned Hallier, of Jena, have brought to light in the nasal discharges and circulating blood of glandered horses, the *coniothecium equinum*,* a microscopic parasite of the same genus as the *coniothecium stilesianum*, which is the active agent in the Texas

* See last plate of illustrations in the special report of the Board of Health.

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cattle disease, and is effectually destroyed by very weak solutions of carbolic acid.

Indeed, in many aspects of the case, the experience of the past year in connection with the Texas cattle disease, has been full of interest to the citizens of this State, whether engaged in the handling of live stock, or deriving their supplies of meat from the public markets of the large cities.

All which is respectfully submitted.

M. R. PATRICK,
LEWIS F. ALLEN,
JNO. STANTON GOULD,
Commissioners.

ALBANY, *January*, 1869.

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DOCUMENTS REFERRED TO IN REPORT OF COMMISSIONERS.

(A.)

THE CATTLE DISEASE.

IMPORTANT PAPER FROM THE COMMISSIONERS.

Upon the request of the Governor, the undersigned Commissioners convened at Albany on the 17th instant, and after careful deliberation, make the following announcement to the public:

In view of the fact that the Commissioners appointed in pursuance of chapter 740 of the Laws of 1866, have power and are directed to establish all such quarantine or other regulations as they may deem necessary to prevent the spread of the disease (rinderpest or other contagious disease) in its transit in railroad cars, by vessels, or by driving along the public highways; and also to appoint Assistant Commissioners, whose duty it shall be to carry out "such quarantine and other regulations;" and who, in order to effect this, are clothed with all the power conferred by this act on the said Commissioners, or their agents or appointees, in order to obtain a perfect history of this disease for future use; and also to subserve most fully the purpose of this Commission, they have deemed it advisable to select the most practically scientific men in the State to act as such local Assistant Commissioners, or health officers, to carry out the intentions of the law and to preserve proper medical records.

They have also appointed Assistant Commissioners for the various localities infected or suspected of having been infected or exposed to the infection known as cattle disease, to the end that all persons dealing or having an interest in cattle in the various States, shall be made acquainted with the measures which this Board has deemed prudent to adopt, and in order that as little delay may be caused in the movement of such cattle, or loss to the owners thereof, as is consistent in the present emergency. It is believed that the sanitary and other authorities of adjoining States, will act in harmony with this Commission in promptly carrying out measures which it is hoped will speedily arrest the disease.

General instructions will be given to all such Assistant Commissioners, varying, perhaps slightly, depending upon the circumstances which may surround each locality, from time to time changing such regulations as they may deem necessary to prevent the spread of disease on its transit on railroad cars or by driving along the public highways:

Firstly. All cars containing cattle will be stopped at the most convenient point on or after entering the State, and if such cars are not in a proper sanitary condition, the cattle, even though healthy, are to be disembarked and the cars thoroughly cleansed and disinfected. After the completion of this process, if the cattle continue healthy, they can be reshipped; such cars upon reaching such further point or points of inspection as may be designated by this Board, will

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again be inspected, and if found unclean, will be subject to such other stoppage, examination, cleansing and disinfection as may be necessary.

Secondly. If at any point on the line of said railroad or railroads, the said Assistant Commissioners shall learn by inspection or information of the existence of disease in cars, they shall be stopped at some convenient point on the road, where they have reason to believe that no infection exists, such cars thoroughly cleansed and disinfected, the sick taken from the well, and properly isolated and kept under proper sanitary restrictions and medical treatment. If any such cattle are slaughtered, the skins must be thoroughly disinfected, properly preserved and kept on the premises, or deeply buried. The carcass of the animal itself should be either tried into tallow in the most approved manner, or else, with the offal, etc., should be deeply buried. Cattle sick with this disease should not be slaughtered until in the judgment of the Commissioner, or his Assistant on the spot, they are past recovery.

The well cattle exposed to this disease should be removed from the cars to some distance, and furnished, as above directed, with a sufficiency of water and food, with salt at will, and kept under proper surveillance for such period as may be directed from time to time. All places or yards, or fields in which cattle are sick, or in which cattle have been exposed to disease, are to be kept disinfected. The sick cattle, and all such as have been exposed to disease, and in which the disease may be incubating, should be kept in an enclosure separated from all well cattle by a neutral ground of at least one thousand feet.

All cattle yards or places in which diseased cattle, or cattle exposed to disease, may have been, must be thoroughly cleansed and disinfected before being again used for the herding of other cattle. If in the judgment of the Commissioners or their Assistants, such yards or reception places for cattle are not susceptible of being cleansed and disinfected, they will be cleansed, &c., as well as may be, closed, and other cleaner places being substituted therefor.

Thirdly. All cattle being sent to market, on entering the State, or being carried on vessels in the State, or by driving on the public highways, will be subjected to the same careful inspection and sanitary restrictions as above directed for those carried in the cars.

The clothing of persons engaged in the care of diseased cattle, or in the slaughtering or rendering of the same, or in any employment bringing them in contact with them, or of those employed in the care of suspected cattle, should be cleansed and disinfected before leaving the premises. The Commissioners will prohibit the slaughtering of animals for beef after they have been exposed to the contagion, until all sanitary restriction is withdrawn therefrom.

DISINFECTION.

For disinfection of the cars, yards and other places, the Assistant Commissioners will be instructed to depend mainly upon the use of carbolic acid, the various preparations of chlorine, quicklime and the different sulphates. Attention is also called to the directions for disinfection given by the Board of Health, New York, and published on Saturday, the 15th instant, in most of the papers throughout the country. The aforesaid Assistant Commissioners will be directed to communicate daily with the Governor, each of the Commissioners, and President of the Metropolitan Board of Health, giving information and receiving additional instructions.

As the carrying out of these regulations involves a knowledge of the principles of Quarantine, Dr. John Swinburne, Health Officer of the Port of New York, has

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been entrusted with the general sanitary supervision, and will at once make a tour of the State to superintend the carrying out of the above regulations. Dr. Jacob S. Mosher and John Phillips, of Albany, and Dr. William Manlius Smith, of Manlius, have been appointed assistant Commissioners. Others will be appointed soon.

M. R. PATRICK, *Chairman.*
JOHN STANTON GOULD, } *Commissioners.*
LEWIS F. ALLEN, }

ALBANY, *August* 18, 1868.

(B.)

THE CATTLE DISEASE.

OFFICIAL REPORT OF THE CATTLE DISEASE BY THE COMMISSION OF THE STATE TO INQUIRE INTO ITS ORIGIN AND CHARACTER.

The undersigned, Commissioners appointed under the act of the Legislature of the State of New York, passed April 20, 1866, for the prevention of the spread of the Rinderpest, and other infectious diseases, having, since the publication of their regulations on the 18th August, had an opportunity of seeing many cattle sick of the Texas cattle plague, and of learning much respecting its history and the circumstances attending its manifestations, and knowing the anxiety of farmers in various parts of the State to obtain information respecting it, have deemed it proper to communicate the following facts for the information of such as are interested in cattle and beef:

1. *How the Disease is Communicated.*—We have not heard of a single case of the disease having been taken by any animal that has not been in contact with Texas cattle, or with their excretions. We have had authentic evidence that Texas cattle that have passed over a road, dropping their excrement thereon, have communicated the disease to native cattle that passed over the same road forty-eight hours afterward. We have no evidence whatever that native cattle afflicted with the disease have in any case communicated it to other native cattle; at the same time we have not felt at liberty to act upon the negative testimony, but in our quarantine regulations we have acted as if the disease could be thus communicated. Sick and healthy animals have been mingled together at several of our quarantine yards, and in no case have the healthy animals yet developed the disease.

2. *The Disease is Aggravated by Motion, and Ameliorated by Fresh Air and Repose.*—We have abundant evidence upon this point, which is entirely satisfactory to us. Wherever cattle have exhibited the earliest symptoms of the disease, and have been taken from the cars and allowed suitable food and drink, with rest and fresh air, they have invariably recovered speedily; while those which have exhibited the same symptoms, and have gone forward in the cars from sixty to one hundred miles further, have rapidly developed the disease in its most malignant form, and it has been necessary to send them to the bone-boiling establishments. It is, therefore, decidedly for the interest of the drover to withdraw the cattle from the cars at the appearance of the earliest symptoms, and subject them to the hygienic measures above spoken of.

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3. *The Earliest Symptoms of the Disease.*—The first symptom of the disease in all the cases observed by us and by our Assistant Commissioners, is an appearance of languor and weariness, which is unmistakable; the head droops, the ears hang down, the eyes are staring. This sometimes occurs when cattle are terrified, but the stupid stare of the cattle affected by the disease is very different from the furious stare produced by terror. The back is arched, strong efforts are made to dung, which are often ineffectual, the droppings being unusually dry, scanty, and stained with blood. These symptoms are invariable. The urine is generally dark brown in color, and commonly called "black water." This symptom is not, however, always present in the earlier stages of the disease. The coat is generally rough, the hairs standing almost erect. The horns are hot, the nose dry, and a frothy drool from the mouth; flies settle in great numbers upon them, and the animal rarely makes an effort to brush them off. These latter symptoms are not invariable, especially the roughness of the coat. In cases of doubt, the most reliable distinguishing mark is undoubtedly afforded by the thermometer. If, in connection with the before named symptoms, the thermometer, introduced into the rectum for two or three minutes, shows a temperature much higher than one hundred degrees Fahrenheit, the animal may be safely pronounced to be suffering under the disease. In some cases it has come up to one hundred and nine degrees Fahrenheit.

4. *How the Meat of Diseased Animals may be Distinguished.*—The fat has a deep or high colored greenish yellow appearance, and has not the firm resistance of health. The lean meat is of a brownish mahogany color, and on being cut into has a peculiar sickening odor. Sometimes the superficial muscles have the natural pink red tint, but the deep seated muscles, and especially the intercostal muscles (those between the ribs), have the dark brown color and nauseous smell.

5. *Disinfection and Disinfectants.*—Carbolic acid is an absolute and perfect disinfectant. It not only destroys the odor but kills the virus of the disease. We advise all farmers and drovers who have reason to suspect that their cattle have been exposed to the infection, to sprinkle the substance known as "heavy oil," which contains about ten per cent of carbolic acid, abundantly about the yards where they are confined, and to put some carbolic acid into the water they drink, in the proportion of one part of pure acid, with thrice its own weight of sal soda, to one thousand parts of water.

6. *The Disease is not Necessarily Fatal.*—Several cases have recovered under our immediate observation, that have exhibited unequivocal indications of severe disease, at Providence, Communipaw and the National drove yards. In some instances the diseased cattle have been pastured where they have had access to salt marsh grass, for which they have exhibited a decided fondness, abandoning the upland pastures and confining themselves to the salt marshes, and it appeared to accelerate their recovery. In other instances, where such facilities could not conveniently be had, salt was liberally supplied and a recovery was manifest. Diluted carbolic acid used as a drink has appeared to act beneficially; but we do not wish to speak positively with respect to these apparent remedies. One of the cattle which had been seriously diseased, but was convalescent, was slaughtered in our presence. The fat had nearly recovered the normal color; the lean meat still retained much of the characteristic brown color of the disease. The viscera showed unmistakable marks of recent disease, but were rapidly healing. We barely allude to this most interesting disease in this place, leaving full details for description by our scientific associates.

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7. We have reason to believe that our Assistant Commissioners have been very faithful in executing our instructions. We hear from every point, that the movement and marketing of infected cattle is effectually stopped. Our Assistant Commissioner, Dr. M. Morris, acting in conjunction with the Board of Health for the Metropolitan district, has been indefatigable in devising and executing a series of measures which, it is believed, will effectually protect the citizens of the Metropolitan district from the dangers of diseased meat. In fact, we have no doubt that the meat now sold in the markets of that district is far more sound and healthy than it was even before the outbreak of this disease.

8. The committee for scientific investigation under the Metropolitan Board of Health have caused an extensive series of researches, under the supervision of Dr. E. Harris of that Board, in regard to the chemical, microscopic and chief pathological characteristics of this disease, and also caused most accurate drawings to be sketched to illustrate the pathological changes in the several organs and tissues that are chiefly affected. These, when published, will present an exhaustive exposition of all phases of the disease, and give peculiar satisfaction to the public generally as well as to scientific men.

M. R. PATRICK,
LEWIS F. ALLEN,
J. STANTON GOULD,
State Commissioners.

NEW YORK, *September* 5, 1868.

(C.)

THE CATTLE DISEASE.

ILLINOIS COMPLAINS OF THE ACTION OF THE NEW YORK AUTHORITIES—COMMISSION APPOINTED TO VISIT THIS STATE.

On Monday last, says the *Springfield (Ill.) Journal* of September 2d, an informal meeting of several of the citizens of this section interested in cattle and the cattle trade, was held at the office of Colonel John Williams, in this city, for the purpose of devising some means for the protection of the shippers of stock to Buffalo, New York, and other points. The committee addressed a letter to Governor Oglesby, and in accordance with the wishes of the committee, he appointed Messrs. Harvey N. Edwards and Edmund H. Piper as Special Commissioners to proceed to New York to look after the interests of Western shippers of cattle. He also addressed a letter to Governor Fenton, of New York, in relation to the matter.

Below we publish the letter of the committee addressed to Gov. Oglesby, and other documents relating to the matter.

The following is the letter to the Governor:

SPRINGFIELD, ILL., *Monday, August* 31.

His Excellency RICHARD J. OGLESBY:

The undersigned having been appointed a committee, by a public meeting of some of the citizens of Sangamon county interested in the cattle business, to wait on your excellency as Governor of Illinois, and request of your excellency a sum-

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official power or authentic letter authorizing and empowering Harvey N. Edwards of Sangamon, and Edward H. Piper of Macon county, to proceed to Albany and Buffalo, in the State of New York, and there take into consideration, among the conflicting and clashing interests of the harsh speculators, the best cattle interest of the State of Illinois. There is reason to fear that the interest of Illinois will be sacrificed unless this matter is promptly attended to.

Hoping you may give as strong a power as you have authority to do, we subscribe ourselves, most respectfully,

S. H. JONES,
JOHN WILLIAMS,
W. H. HERNDON,
Committee.

Appointment of Special Commissioners.

STATE OF ILLINOIS, EXECUTIVE OFFICE,
SPRINGFIELD, *Sept.* 1, 1868.

To all whom these presents shall come, greeting:

Responding to the wishes of our citizens especially interested in preventing disease among cattle, and in protecting the trade in and shipment of live stock from the State of Illinois to Eastern markets, as formally expressed in a resolution passed at a meeting of citizens interested in stock raising and shipment of cattle, held in Sangamon county, August 31, 1868, I do hereby appoint and commission Harvey N. Edwards, of Sangamon county, and Edmund H. Piper, of Macon county, as Special Commissioners, to proceed to the State of New York, with full power to inquire into and coöperate with the efforts made by the authorities of the State of New York, referring to and bearing upon the shipment of cattle from this State to the Eastern markets, and especially to petition the Executive authority of that State and the Special Commissioners or Inspectors to whom has been intrusted, under the laws of said State, the power to impose restrictions and limitations upon the trade in and shipment of cattle to Eastern markets, to so regulate and alter the same as not to hinder or embarrass oppressively the shipment of and trade in stock from the State of Illinois. In this respect due consideration will be given to prevent and suppress the disease or threatened epidemic among cattle.

The Commissioners appointed by this authority have full power to enter into any arrangements necessary to a satisfactory settlement of all questions arising upon the subject of their appointment.

In testimony whereof, I have hereunto set my hand and caused the great seal of the Sate to be hereunto affixed. Done at the city of Springfield, this first day of September, in the year of our Lord one thousand eight hundred and sixty-eight.

RICHARD J. OGLESBY.

By the Governor:

SHARON TYNDALE, *Secretary of State.*

Letter of Gov. Oglesby to Gov. Fenton.

STATE OF ILLINOIS, EXECUTIVE OFFICE,
SPRINGFIELD, *Sept.* 1, 1868.

His Excellency REUBEN E. FENTON, *Governor of the State of New York, Albany:*

DEAR SIR—I take pleasure in introducing to you, and recommending to your favorable attention, Messrs. Harvey N. Edwards and Edmund H. Piper, of this State, whom I have this day taken the liberty to appoint as Special Commission-

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ers to visit your State for the purpose of making inquiry into the restrictions your authorities have deemed important and necessary to impose upon the trade in and shipment of cattle from this State to the Eastern markets, in consequence of an apprehended epidemic among cattle, commonly known as the Spanish or Texas fever. I will thank you, in behalf of the people of this State, for any assistance or suggestions you may be able to give these gentlemen, to aid them in securing the objects of their appointment.

They have been instructed to present to you their authority, and to confer with you freely on the subject, in a spirit of entire good will, to the end that trade may not be unnecessarily restricted, and that both the consumer and shipper may enjoy the full benefit of as free trade as is possible under the circumstances.

With high regards, I am, Governor, very respectfully, your obedient servant.

R. J. OGLESBY, *Governor of Illinois.*

(D.)

ALBANY, *October* 13, 1868.

DEAR SIR—In view of the ravages of the disease known as the Texas fever among cattle, and the inadequacy of the laws enacted by the several States for the repression of this and other kindred diseases, and the conflicting provisions of these laws, which have been disclosed since this disease has been prevalent, a general desire has been felt and expressed by farmers, drovers and the consumers of meat in several States, that a wise and efficient system of legislation should be adopted for the repression and prevention of this and other similar diseases in the several States, so that the laws should be harmonious, and adapted to mutual protection. And it has been believed by nearly every one that has expressed an opinion upon the subject, that the best mode of effecting this object is by the assembling of a Convention of the Cattle Commissioners of the several States interested in the subject, who would represent all the varied interests of the producing and consuming States, and supply all the information necessary for the full elucidation of the subject, and whose duty it should be to prepare a draft of a law which should ensure the most perfect protection to all parties, to be recommended to the several Legislatures for adoption. And the Commissioners of the State of New York having been requested by the Commissioners of several of the States, and of the Dominion of Canada, to take the initiative in calling such Convention,

We do, therefore, recommend that a Convention be held in the city of Springfield, in the State of Illinois, on Tuesday, the first day of December, 1868, at twelve o'clock at noon of said day.

The object of such Convention is to consider the pathology, symptomatology and history of the Texas cattle fever, and other infectious and contagious diseases to which cattle and other stock are subject, and the best methods of preventing the spread of such diseases with reference to the interests of the producer and consumer, and also to consider the sanitary requirements of the community with reference to the feeding and rest of the animals in transitu, and to the best methods of slaughtering and preparing them for market. The Convention will also prepare a draft of a law which shall provide for the accomplishment of these objects, to be submitted to the Legislatures of the States represented therein for adoption. Each State and Province to be represented by three (3) Commissioners.

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The Cattle Commissioners of the State of Illinois are requested to secure a suitable place of meeting for the Convention.

His Excellency the Governor is hereby respectfully requested to transmit copies of this call to the Governors of the several States, where such Commissioners are not already appointed, with a request that they would appoint such Commissioners to represent their States in such Convention.

M. R. PATRICK,
L. F. ALLEN,
JOHN STANTON GOULD.

(E.)

SUGGESTIONS TO FARMERS.

1st. When the disease makes its appearance in any neighborhood all the owners of neat cattle should make a point of examining each animal every morning. The chief points to which their attention should be directed, are the following:

(*a.*) The head. Whether it hangs down; whether the eyes are dull and staring; whether the horns are hot or cold

(*b.*) The coat. Whether it is rough or smooth.

(*c.*) The urine. Whether it is a dark red or black.

(*d.*) The hind legs. Whether the gait is staggering, and whether the knees seem weak.

(*e.*) The dung. Whether it is natural or otherwise, and especially whether the animal arches its back and makes ineffectual efforts to dung.

(*f.*) See if there is any drooling of frothy matter from the lips.

(*g.*) If you have a fever thermometer, insert it into the rectum (bung), let it remain until the mercury ceases to rise, then note the temperature. If it is 102° Fahrenheit, and any of the above mentioned symptoms are present, you have good reason to suspect the presence of the Texan cattle fever, and the probability is increased by every additional degree of temperature.

(*h.*) It is very important that the dates be carefully observed of all the symptoms connected with the disease, and experience has shown that memory is very untrustworthy; by all means, therefore, let the above facts be clearly *written down* as soon as possible after the observation is made.

(*i.*) Shut up all suspected cattle in a lot or building by themselves, so that no other cattle can have access to them or their droppings.

(*j.*) Send word as soon as possible to the nearest Assistant Commissioners, of the suspected cattle, by telegraph, if one is accessible.

2d. Means of prevention.

(*a.*) When the disease is present in any neighborhood, every owner of cattle should be provided with a barrel of heavy coal oil, which contains from eight to twelve per cent of carbolic acid, and a quart of liquid carbolic acid containing ninety per cent of the acid. The latter is miscible with water; the former is not.

(*b.*) If the suspected cattle are kept in a building, let the floors be sprinkled with heavy oil, and especially let it be sprinkled on the droppings as fast as they

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are made. The woodwork of their stalls, and behind their stalls, should be covered with this substance, spread on by a common whitewash brush. The heavy oil may be sprinkled on the floor with a common watering pot.

(N. B.—These articles are furnished by the Warren Chemical Manufacturing Company, No. 4 Cedar street, New York.)

(*c.*). If the suspected cattle be herded in a yard or small pasture, let the droppings be sprinkled daily with heavy coal oil.

(*d.*) Remember that strict isolation is the chief means of safety. Let no strange animal come upon the place. Let no suspected animal go upon the public road, or have access to running water to which other animals go. The dung and urine of diseased animals are the chief means of propagating the contagion, and it is known that it is often diffused by the dung which adheres to the shoes of attendants. A box containing slacked lime or ground plaster, well saturated with the heavy oil, should be kept near the diseased animals, and all persons when leaving the vicinity of such animals, should carefully rub their shoes in the powder in the box.

3d. Curative means. There is no certain cure for the disease. Some animals get well without any medicine, others seem to have been benefited by feeding in a salt marsh and on green corn.

(*a.*) In case you have the liquid carbolic acid of ninety-five per cent which will mix with water, drop enough of it into a part of water to give a slight taste to the water, and let the diseased cattle drink of it twice a day.

(*b.*) If you have nothing but the heavy oil, mix three ounces of soda with it, which will render it miscible with water, and put the mixture into a quart of water; pour enough of the mixture into a pail of water, and let them have two pailsfull a day.

(*c.*) Let the sick animals drink freely of water, as they are generally thirsty, and place salt where they can lick it whenever they are disposed to do so.

(*d.*) With regard to food, follow the advice of the medical practitioner.

(N. B.—If carbolic acid cannot be obtained, dissolve two pounds of sulphate of iron—green copperas—in a gallon of water, and use the solution as directed for the heavy oil.)

Let all animals that have died of the disease, be buried at least seven feet deep. Cover them with a barrel of lime, then replace the earth.

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REPORT UPON INVESTIGATIONS

CONCERNING THE

TEXAS CATTLE DISEASE.

To the Sanitary Committee of the Metropolitan Board of Health:

The investigations that were committed to your direction in regard to the infectious disease in beef cattle, by the Metropolitan Board of Health, are now so nearly terminated that it becomes a duty to report to you the results which have been reached in the inquiries that you placed under the writer's supervision.

In presenting this report, the superintendent of the work feels that it is due to your committee, and especially to the medical officers who have been engaged in these researches, to state that this duty was undertaken at a period when each of us was burdened with an unusual amount of work, and that whatever may appear in the report to be incomplete and too meagre in the record of details or circumstances concerning these labors, might justly be charged to the excessive demands that were made upon our time, as well as to the new and difficult nature of the investigations. And, in addition to this, it is proper to remark, in this introductory paragraph, that these investigations were at first undertaken and subsequently carried forward—step by step—wholly from a consciousness of the duty which was due to the Board of Health, and by the Board to the public; and that if the Board could have found the means to employ more aid in this work, your committee would now be able to present at the conclusion a more complete report.

The exigency was instantaneous, and the duty of making an investigation in the interest of the public health and of sanitary knowledge was obvious; but until the nature and extent of this remarkable infection in the herds that supply our markets had

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become known, it was not certain that the results of these investigations would warrant the scope and cost of them unless the labors were voluntarily assumed by medical men who were already in the Board's service. The possibility of prosecuting any exact and trustworthy scientific investigations depended, practically, upon the willingness of medical officers to make considerable sacrifices of time and toil; and it is due to them and to the Board that the fact should here be stated, that the hope of making these investigations contribute something to hygienic and medical knowledge, particularly in regard to pestilential fevers, continued to inspire and sustain these labors after all danger of the sale and use of the diseased beeves had passed. The medical profession and sanitary authorities will bear witness that this hope has not been disappointed.

Practical difficulties in conducting such investigations unfortunately deter Boards of Health and individual observers from attempting to make their inquiries systematic and comprehensive; and it has been found impossible to make all branches of these inquiries in New York as complete as the requirements of exact investigations demand. This is especially true of the medical observations upon symptoms and tests of the disease in its various stages. But whatever observations were possible during the brief last stage of the disease, are put on record in this report. Great difficulties were experienced by the committee of investigation in reaching the diseased animals, and providing for the killing and dissecting of them. So sudden was the onset of the obvious or fatal stage of the malady that this circumstance is found to have effectually defeated the attempts of many of the best sanitary officers in other places. It has been easy to find and examine dead cattle, but difficult to bring medical observation to bear upon the living, and upon the condition of the organs and tissues at the moment of death, and before any post mortem changes could occur. It is this latter feature of success that gives special value to the results reached in the Metropolitan district.

The requirements of the present advanced state of pathological and hygienic knowledge demanded that whatever investigations we undertook in this matter should extend beyond the merely superficial and obvious phenomena and appearances, and that, so far as possible, the methods and purposes of each line of inquiry should be exact, searching and strictly in accordance with the requirements of the sciences whose aid should be invoked in the work. It was also known to us that the Metropolitan market being the natural

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terminus of the great railroad route for such herds of infected beeves as might be hurried forward by the unfortunate holder of them—true to "the commercial instinct to make whatever salvage he can," when an incubating poison threatens inevitable destruction to his cattle and his fortunes—the opportunity and the public duty of making faithful investigations would probably be greater in New York than at any other point east of the prairies, which had become the temporary source of the disease. Experience soon confirmed the truth of this opinion.

Lest the nature of the sanitary questions, which were of predominant importance in these investigations, may be misconceived by readers of this report, the fact must here be stated that no medical officer presumed that the Texas cattle disease would reproduce itself in the human family. But it was believed, and it is true, that the rapidly and utterly putrefactive effect of this disease in its fatal stages, clearly pronounce upon the unfitness of such dying cattle for human food. This view of the subject did, at first, very energetically animate the endeavor which the Board of Health put forth to prevent such dead and diseased beeves from being sold in the markets. But it must not be supposed that the Board's officers were ignorant of the fact that some of the most deadly viruses, even that of the rattlesnake and the woorara, may be taken into the human stomach without obvious harm. The point aimed at was attained, namely, to prevent the diseased and dying beeves from being used for food. The means employed by the Board in attaining this result, were universally understood and appreciated. The press and the people throughout the Metropolitan district, and wherever the diseased cattle were seen, emphatically sustained and commended this action of the Board. Herdmen and agriculturists also gave their willing testimony and obedience to the mere recommendations of the sanitary officers, and are now sincerely grateful for the practical results of the sanitary regulations and the scientific inquiry relating to the disease.

In pursuing these labors, the Board's committee has sought information from every available source throughout the country, and has enjoyed the most hearty coöperation from every class of observers of the disease; and it seemed very desirable to make investigations, upon as broad a basis as possible, of general information concerning it. Such a basis has given a certain tone of trustworthiness to the Board's work, that is justly a subject for the committee's gratitude. Great care has been taken to examine and

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analyze the mass of general and special evidence that has, by the kindness of correspondents and co-workers, come into our hands. The conclusions that are reached in this report are in harmony with all that is logically deducible from that body of evidence, though we have depended upon our own observations and the collateral researches that grew out of them.

Could the medical officers who have pursued these inquiries now consult their personal preferences, they would defer the presentation of this report until there shall have been a free interchange of the various reports by State Commissioners; but the request that this report shall be submitted without such delay, is obeyed with alacrity, because both the Board of Health and the State Commissioners for the prevention of cattle plagues in New York, have expressed a desire to make immediate use of the information contained in this report. But in thus hastily closing the report, it must inevitably be marred by defects that will need to be corrected hereafter. The culture experiments upon the cryptogamic or fungus element found in the blood and bile of the infected cattle, are still in progress under the skillful hands of Dr. Stiles, the deputy registrar of the Board of Health, and of Prof. Ernst Hallier, of Jena, and will be continued as long as they may deem it desirable. These and some other incidental inquiries, while they may eventually throw light upon the causation and concomitants of the disease, do not in any way postpone the practical conclusions and sanitary measures which State authorities need to adopt. And there is much reason to believe that every branch of the investigations which have been commenced under the approbation of your committee and of the Board, will ultimately lead to a correct knowledge of the disease, and to the utter extinction of it. If, in attaining that result, it is found that important truths are established concerning the cause and prevention of certain pestilential diseases in the human family, the public duty of exact inquiry into the causes and prevention of all epidemic and epizoötic diseases will be practically illustrated. This ultimate object of medical inquiry will not fail to be attained if sanitary officers will, in the discharge of their duties as guardians of human health, carefully observe and investigate the nature and causes of the infectious plagues that occur in those useful classes of animals which the beneficent Creator has given to man for food and service. The people who require safeguards against insidious sources of disease, will share with the

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herdman and the farmer such immediate and obvious benefits of the sanitary investigation and restraint of cattle plagues, as will fully repay the toil it costs, and in the end, the total results will be found added to the sum of human happiness and healthy life.

E. HARRIS.

New York, *December* 31*st*, 1868.

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PLAN OF THIS REPORT.

I. A consecutive account of events connected with the appearance of the Texas Cattle Disease, and of the procedures which were taken thereon.

II. The Records of the Sanitary Inspector of the Board and Assistant Commissioner of the State, concerning the herds of Diseased Cattle that have come into the Metropolitan District.—Dr. MORRAU MORRIS' Special Report.

III. Statement of the Results sought and reached in Correspondence with other observers.

IV. Statement regarding the chief objects of exact Scientific Investigations, the nature of the Methods adopted for attaining them, and the Results attained.

V. Special Report, by R. Cresson Stiles, upon the Pathology of the Cattle disease, and upon the Microscopical Researches for ascertaining the Nature and Effects of the Contagium, or Cause of this Disease.

VI. Report of the Results of Chemical Analysis of the Blood, Bile, Urine and Liver, obtained from the Diseased Cattle. By Prof. C. F. CHANDLER.

VII. Explanations of the Illustrations.

VIII. With what well described diseases is this Texas Cattle Disease allied?

IX. Remarks upon the New Facts and Demonstrations added to Physiological and Pathological Knowledge by these Investigations.

X. Conclusions.

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I. ACCOUNT OF EVENTS AND PROCEEDINGS.

DISCOVERY OF THE DISEASE IN THE HERD YARDS.

Early on the morning of August 8th, the Registrar of the Board of Health obtained information from a member of the staff of the daily *Tribune*, that there was believed to be a herd of diseased and dying cattle at one of the two great herd yards near Jersey City. Certain unusual events in the progress of sudden and fatal diarrhœal disorders, in various parts of the city of New York, in the previous ten days, induced us to make a personal investigation concerning the reported herd of infected cattle. Proceeding to the abattoir yards at Communipaw, the fact was ascertained that there were then remaining alive upon the grounds there, one hundred and forty-one bullocks that arrived the previous day, consigned to J. T. Alexander, Esq., Mr. Fitch, agent, and out of which there had died, or been sacrificed, because dying, two hundred and twenty-four bullocks during the trip from Homer, Ill., to this eastern terminus of the route.

Having ascertained the fact that these cattle had been shipped from Central Illinois, in apparently perfect health, only eight days previously to the visit here mentioned; that the care of that herd train had been quite as good as is usual upon the railroads; that the disease began to be noticed about the second day after departure upon the route, and that between Central Ohio and the time of departure of that cattle train from Pittsburg, a period of four or five days, no less than one hundred and fifty-nine of the herd died of the disease, permission was asked and granted for examining the residue of the herd then in the yards at Communipaw. About fifteen out of the hundred and upwards that were seen, appeared to be sick, and upon testing the temperature of two that were approached, the mercury in the self-registering thermometer went up to one hundred and five, and one hundred and six degrees respectively. This observation not only comported with the circumstantial history of the events above related, but of itself alone this remarkable excess of animal temperature, in the absence

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of any evidence of inflammatory disease, and with the pulse rapid and flickering, the secretion from the kidneys copious and blood-stained, and the gait and posture tremulous, fully warranted the conclusion, that the disease there witnessed for the first time at our herd yards, must necessarily be of a pestilential nature, and that any virus or morbid poison which could cause such a malady, was deserving of the most exact and careful scientific inquiry.

The peculiar circumstances of the season which had made it necessary to watch very vigilantly for all removable and special causes of acute and fatal diarrhœal disorders among the people of the city, rendered it a duty to undertake a careful examination of the viscera and fluids of the dying bullocks, to ascertain what diseased conditions they might present. Accordingly, the Registrar of the Board requested the president of the abattoir to allow the medical officers an opportunity to make such examinations at the earliest convenient hour. It was earnestly advised that no sick cattle should be sent over to the city markets, either alive or dead. Mr. Payson, the president, took an enlightened and proper view of all questions connected with this matter, and remarked that it would be well to have the Governors of New York, New Jersey and Pennsylvania take such action, in concert with the Governor of Illinois, as might lead to the proper investigation of the local sources of the disease, and to a proper restraint upon the transportation of cattle subject to it. The course pursued by that gentleman during the evening of the 8th and the morning of the 9th of August, proved how judiciously and honorably he undertook his own duty in regard to the sick cattle. To this we will presently refer again.

During the afternoon of the 8th, Hon. Geo. B. Lincoln, President of the Board of Health, in concert with Hon. Commissioner Manniere, decided to have the herd yard, within the limits of New York city, inspected under the direction of the Sanitary Superintendent, Dr. E. B. Dalton. The circumstances and results of that inspection are mentioned in the proper place in the special report of Sanitary Inspector Dr. Morris.

Upon the return of the Board's officer from Communipaw, in the afternoon, it was deemed expedient to send dispatches to the Governors of New York, New Jersey and Pennsylvania, giving them information, and suggesting such action on their part as should at once restrain the movement of all sick and infected herds. Consequently, the president of the Board sent telegraphic dispatches to Governor Fenton, at Albany; Governor Ward, at Newark, N. J.,

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and Governor Geary, at Harrisburg, Pa., informing them of the sick cattle, and suggesting the sanitary inspection of the transport trains and herd yards on the railroads that enter these States from the West. The several Governors replied that the desired action would be taken.

There doubtless may have been some persons who thought that such promptitude of official inquiry and action was unwarranted by any possibilities of peril, and by all lessons of experience; and, that there may occasionally be found a man, who still believes that it would have been wiser to wait, and see the results of the pestilence, and of the use of the diseased beeves as food, is not unexpected. But the public would not have excused the sanitary officers for any such stolidity and indifferent delay, nor does experience warrant the belief that it would have been safe or prudent to have delayed action. Indeed, it chanced to be true that the officer who first moved in this duty for the Board of Health, knew the history of epizoötic pestilences too well to admit of hesitation and delay.*

*The following extract from an editorial leader in the *London Times* of August 28th, will now be perused with advantage, for it conveys the true principles regarding such duties, in clear and forcible language:

"As the home of the rinderpest is on the steppes of Russia, so this American plague comes from the vast plains of Texas. Now, it appears that during last May and June some fifteen thousand cattle were slowly driven from Texas to Illinois, feeding on the prairies as they passed. * * * * * * * * * From Illinois, the disease spread to the adjoining State of Indiana, where thousands of cattle are still said to be dying of it, and to the city of Chicago. The next step in its progress was, that some Illinois cattle were dispatched by railway to Pittsburg, in Pennsylvania. Before reaching Pittsburg a large proportion of them perished, and others died in the Pittsburg drove yards. Thence some apparently healthy animals were sent by rail to New York, but the fatal symptoms appeared after their arrival, and within ten or twelve days after the appearance of the cattle at Pittsburg, the disease had penetrated to the northern part of New York State. The history of the development of the disease, therefore, is complete. From Texas it is tracked over the prairies to Illinois, and thence it is followed over railways to the great towns of the West. With us, though the course of the rinderpest is sufficiently established, there are generally some doubtful links in the chain of communication, but in this instance every step is discernible.

* * * * * * * * * * *

"The gentlemen who thought it a fatal objection to a precautionary measure that it might slightly raise the price of meat in the London market, may, perhaps, accept instruction from the fact, that on the appearance of this disease, the supply of beef in the markets of New York and Chicago had fallen off at least one-half. They may see that, from fear of a slight and very doubtful disadvantage, they would have exposed us to the certain peril of an occasional meat famine. This example may also give us occasion to reflect, that at least in the present state of our knowledge, we are quite unable to rely on special acts of precaution against the introduction of a contagious disease. Here is a disease, not less fatal than the rinderpest, of which we have only just heard; and, besides this, its approach is so sudden and so subtle as to leave no time for exceptional measures. Cattle apparently healthy are dispatched to New York, and within three days after their

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THE FIRST POST MORTEM EXAMINATIONS.

The next day, Sunday, August 9th, the president of the abattoir informed the Board of Health that all the surviving bullocks of Mr. Alexander's infected herd were to be slaughtered and sacrificed at the fat-rendering tanks, and he invited the officers of the board to be present and make whatever examinations they desired. This invitation was accepted, and during that afternoon the officers in attendance witnessed the slaughter of a large number of the herd, and made minute examination of the viscera and fluids of three of those that were most diseased. The record of these and all other post mortem examinations of cattle will be found in the proper place in a subsequent section of this report. But we would here remark that the excessive temperature of the blood and viscera of the sick bullocks immediately upon the slaughter was so uniform and striking as to confirm the opinion that had been expressed by the Registrar concerning the significance of this fact in regard to the pestilential nature of the sickness; yet in these first examinations there was so great an amount of evidence of other kinds, and which required the analysis of the microscope, and of the chemist, that arrangements were immediately made to have the morbid specimens so examined by Dr. R. Cresson Stiles, the Deputy Registrar of the Board, an acknowledged authority in pathological and microscopical researches, and by Professor C. F. Chandler, the chemist to the Board. The subjoined note from Dr. Stiles gives the first result he reached in the microscopical examinations which he made of the specimens obtained on the 9th and 10th of August:

arrival, they have given birth to a malady which may destroy all the stock in the State. That is the danger to which we are exposed the instant we relax our restrictions. Inspection might some day fail to detect the germ of disease in half a dozen animals, and the cattle of as many counties might be decimated in a month. Our knowledge is not sufficiently extended, our means of information not sufficiently complete, our methods of observation not sufficiently subtle, for inspection to offer any sufficient security. It is somewhat singular that we should only now be learning to what subtle and contagious diseases our most valuable stock is exposed. Like other knowledge, this has probably been lost from mere want of due records. If the past history of the diseases of mankind had been preserved for us, medical science might now be in a very different position. This disadvantage will scarcely be allowed to check our progress for the future. The New, as well as the Old World, will yield experience, and we think we may fairly expect from our men of science that, with their means of observation, they will materially advance our control over the conditions of health. At all events, *such an example as the present deserves the utmost attention, and we shall await with the greatest interest the further history of the 'Texas Fever.'*"

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BROOKLYN, *August* 12, 1868.

E. HARRIS, M. D., *Registrar, etc.*:

DEAR SIR—I have examined carefully the specimens of the plague cattle which I took on Sunday (August 9th). I went at them at once, before decomposition could change their character.

The Blood.—Not a single red blood disk could be detected. The red disks had parted with their coloring matter, and the serum was of a dark mahogany color. This evidence of disorganization of the blood is a most important fact, as indicating the nature of the disorder.

The Urine—Was of a glutinous character, excessively albuminous; the blood corpuscles which were abundantly contained in it, were shrivelled and crenated. The urine was of a claret color, and contained a few casts of the tubuli uriniferi.

The Kidneys—Were deeply congested with dark blood; and their glomeneli and tubuli uriniferi were filled with extravasated blood.

Yours,

(Signed) R. C. STILES.

Thus the work of scientific inquiry commenced, and the foregoing quotations from the first written statement by Dr. Stiles concerning the pathological changes which characterize the disease, show what direction this kind of inquiry took. The notes of the observations made upon this first group of infected cattle will be found in the subsequent chapter of this report. Unfortunately our efforts to procure a complete chemical analysis of the fluids from these first cases were unsuccessful; yet from one of this herd, that was slaughtered on the eighth day of convalescence, entire success attended the analysis of the blood, etc.

Having examined as many of the animals as practicable in this first herd before and during slaughter, it was deemed expedient to have a certain number of the bullocks that exhibited unmistakable symptoms of the disease, and yet were not rapidly sinking or incapable of moving about, selected and kept under medical observation and care, in order that the nature of the disease might be suitably studied, and if the sick bullocks survived through certain periods of partial or actual convalescence, they might, at suitable periods be, one by one, slaughtered for the purpose of making post mortem examinations of the results of the disease, and the mode and rapidity of convalescence from it. Consequently, by the liberality of the agent of the stock, five such diseased bullocks were selected and placed by themselves in a large yard that was spread with a bed of sawdust saturated by heavy oil of coal tar, and they were allowed to spend the greater part of each day in an adjacent meadow of luxuriant salt marsh grass. The further treatment of these sick cattle, and the results of final examinations of them when slaugh-

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tered, will be found in the subsequent sections of this report, under the heads of "Inspection and Care," "Chemical Analysis," and "Post Mortem Records." But it should be mentioned here that the results of these observations were more definite and satisfactory than we had anticipated. In fact the investigations pursued in regard to this first group of infected cattle served to open up the whole field of inquiry that was subsequently occupied by the medical officers who followed up the subject.

The fact must here be mentioned that the excessive pressure of regular official duties, the difficulty experienced in securing the attendance of each officer and expert at the hours of slaughter, and the great distance and inconvenience of access at the abattoirs from the chambers of the Board of Health, offered serious impediments to successsful study of the disease at the beginning and throughout the entire season. These and other considerations led us to hope and greatly to desire that the State commissioners of New York and New Jersey who still had authority under their Commissions to guard against rinderpest and contagious pleuro-pneumonia, might, as soon as they could organize for the purpose, assume all the responsibilities and expenses of the investigations which needed to be made.

Another fact ought also to be stated in this place in regard to the coöperation of veterinary experts in these investigations. Such coöperation was desired, but as there were no pecuniary means for procuring or properly compensating such persons, and as it was hoped that the entire responsibility in the matter would soon be assumed by the State commissioners, as just mentioned, we early endeavored to give to leading professors of the New York College of Veterinary Science, information of the opportunities to inspect infected cattle. Professors Liautard and Busteed of the New York College, and Prof. Law of the Cornell University, did witness some of the post mortem dissections. But as the fact was soon ascertained that no funds were provided for the State commissioners to expend upon such inquiries, or for any purpose whatsoever, those medical officers whom the Board directed to begin the investigations, were compelled by circumstances and their own sense of duty to continue the work. Events succeeded each other so rapidly, that these officers had to meet the exigencies day by day, and seek such information, and do such acts as seemed most important for the Board and the public, or, by neglecting these duties, let the golden opportunity for investigating and restraining the malady be left until some future outbreaks of it, and to allow this opportunity

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for the hygienic inquiries connected with the malady to pass by unimproved.

The arrival of a badly infected herd of fat beeves by the Erie railroad, on the morning of the 11th of August, while yet no other organization for investigation was in existence, induced the Board of Health to order that this matter should henceforth be placed under the advice and direction of the Sanitary Committee, to do whatever they should deem necessary to represent and discharge all the duties which the public could reasonably expect from the Board in regard to the control of the diseased cattle, and the investigation of the whole subject. Subjoined is a copy of the Board's minutes relating to this duty of the Sanitary Committee and associated medical officers:

THE BOARD'S ORDERS FOR ORGANIZING THE LABORS OF INQUIRY.

At a meeting of the Metropolitan Board of Health, held on the 11th of August, and at which reports in relation to the first two infected herds were presented, the following action was taken:

[*Copy.*]

Resolved, That the Sanitary Committee of the Board be and hereby is empowered to detail expert officers, not exceeding four in number, who are connected with the Board, to act under the orders of said committee in the investigations of the facts relating to the prevailing *cattle disease*.

The committee ordered the labors to be organized in accordance with the following instructions:

METROPOLITAN BOARD OF HEALTH,
August 11, 1868.

To E. HARRIS, M. D., *Registrar and Corresponding Secretary M. B. H.:*

DEAR SIR—At a meeting of the Board of Health, held August 11, the subject of the prevailing cattle disease was referred to the Sanitary Committee for investigation and report. The committee was empowered to add, not to exceed four members (who should be officers of the board), to their own number for such investigation. In pursuance of this power the Sanitary Committee has selected you as one of the additional members of the committee.

It is the desire of the committee that you proceed to organize the work of investigation, and so distribute its several subjects among other members, and control their operations, as to secure the most perfect results.

Yours, &c.,

STEPHEN SMITH, M. D.,
Chairman Sanitary Committee.

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METROPOLITAN BOARD OF HEALTH,
August 12, 1868.

To R. CRESSON STILES, M. D., *Deputy Registrar M. B. H.:*

DEAR SIR—The subject of cattle disease as it has appeared in the markets in and around New York, has been referred to the Sanitary Committee for study and report. The committee was empowered to add to its number such officers as it deemed necessary, and accordingly it has selected you for the special duty of studying whatever pathological alterations you can discover in the tissues and fluids of the infected animals, and that you will avail yourself of whatever aid the microscope can give in these researches.

You will devote all the time that is necessary for a thorough investigation of the disease, and make full and accurate notes of your observations.

You will also keep in constant communication with Dr. Harris, and follow his directions in your work, unless otherwise directed by the Sanitary Committee.

Truly yours,
STEPHEN SMITH, M. D.,
Chairman Sanitary Committee.

METROPOLITAN BOARD OF HEALTH,
August 12, 1868.

To DR. MOREAU MORRIS, *Sanitary Inspector M. B. H.:*

DEAR SIR—The subject of cattle disease as it has appeared in the markets in and around New York, has been referred to the Sanitary Committee for study and report. The committee was empowered to add to its number such officers as it deemed necessary, and accordingly it has selected you for the special duty of studying the symptomatology or clinical history of the affection as it appears in the herd yards.

You will devote all the time to this duty that is necessary for a thorough investigation of the disease, and make full and accurate notes of your observations.

You will also keep in constant communication with Dr. Harris, and follow his directions in your work, unless otherwise directed by the Sanitary Committee.

Truly yours,
STEPHEN SMITH, M. D.,
Chairman Sanitary Committee.

A similar requisition was made upon Prof. Chandler, Chemist to the Board, for his aid in the necessary chemical analysis; and, at a later date, the duties of Dr. Morris being enlarged by his appointment as assistant commissioner for the State, it became necessary for the committee to employ the aid of one of the assistant sanitary inspectors, and Dr. Benjamin Howard was therefore selected to render such temporary assistance, as was required in post mortem examinations, etc.

In carrying this purpose of the Board into effect, Dr. Stiles gave his attention to the special pathological investigations requiring microscopical examinations. Dr. Moreau Morris continued his

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duties of inspection of the herds arriving at the New York market, and was requested to have charge of the medical observations upon all diseased cattle, and, with Dr. Stiles, to report to the central office daily concerning the progress of the inquiries. To Prof. C. F. Chandler, of the School of Mines, Columbia College, and Chemist to the Board, was committed the chemical analysis of morbid specimens from the diseased animals, and for which duty he thoroughly prepared two of his assistants. The Registrar of the Board, as the medical officer in charge of the researches, organized and pushed forward the inquiries, visited the infected cattle, and was present at the post mortem examinations when possible, and had the general supervision and control of the work, and was especially charged with the organization and maintenance of the scientific investigations.

It was plainly necessary to have such organized labor in order to centralize and give efficiency to whatever investigations might be undertaken. The Board needed all the information which could be brought to its central office daily, both for its own use and to satisfy inquiries constantly made in regard to this disease.

THE ARRIVAL OF AN INFECTED HERD FROM INDIANA.

On the evening of August 10th, the superintendent of the Bergen cattle yards, Hudson city, N. J., applied to Gov. Ward and Dr. Harris, who were then at Communipaw, asking their advice as to the disposal of a herd of seventy or more infected cattle, then on the way from Campville (Erie railroad herd yards) to his sales' yards at Hudson city, to arrive next morning. Early next morning, August 11th, Sanitary Commissioner Dr. Stephen Smith, Inspector Morris and Dr. Harris visited the yards and herd train near the Hackensack river, where this lot of infected cattle had been switched off from the Erie railroad. Here were seen several fine fat bullocks in a dying condition, and no less than fifteen out of this herd—now consisting of sixty-six cattle—were evidently in a hopelessly diseased state.

For a detailed account of the observations which were made upon this herd, we would refer to Dr. Morris' report upon his department of labor, in a subsequent section. But this group of infected bullocks exhibited the symptoms and pathological effects of this disease with such completeness, and the entire history of the herd itself, the source whence they received the infection, the period of incubation, and whatever else could be a matter of exact

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inquiry, were such that the Board's officers made great efforts to have these dying cattle made the subject of the most thorough investigation. Arrangements were made for the observation of symptoms and post mortem evidences; and Governor Ward took the preliminary steps for keeping the entire herd under close observation. Correspondence was immediately opened with the Governor of Indiana, for the purpose of tracing every step and every day of the history of this herd, which belonged to a Mr. Thomas, of Warren county, in that State.

In all that is essential in the history of this herd, these efforts were entirely successful; but, in the absence of all official authority in the town where these cattle were, speculators shipped about fifty of them to parts unknown, yet five of the worst diseased animals were left for the careful examination of the officers of the Metropolitan Board. This examination will justly be regarded hereafter as being, in every important respect, among the most valuable of all that were made during the whole series of inquiries of the board; for there in the open field, and in the presence of the quivering flesh of the bullocks, immediately upon slaughter, the microscope, under the skillful hand of Dr. Stiles, revealed all the morbid phenomena in the blood, bile and tissues, which finally we have come to regard as being characteristic or pathognomonic of this strange disease. Dr. Stiles, Dr. Morris and Dr. Harris spent the entire day, August 13th, in these investigations, and Commissioner Dr. Stephen Smith was present to witness the most important of the autopsies, and verify with his experienced eye, as a professor of anatomy, the demonstrations by Prof. Stiles. He witnessed the first demonstration of the reticular structure or arrangement of the ultimate bile-ducts, as revealed under Dr. Stiles' microscopes.

To have preserved those morbid specimens in a fit condition for perfect microscopical researches at a later hour, or away from the field, would probably have defeated or long postponed the ends which were achieved that day; for it was necessary to determine what morbid changes in tissues, and what, if any, parasitical organisms, or other morbid elements, could be found, actually pertaining to the diseased cattle at the moment of their being killed. The liver, the bile, the spleen, the kidneys and the blood, the stomachs, the brain and the muscular tissues were each, in succession, examined with great minuteness and care. The nature of the discoveries that were made during that day will be fully explained in Dr. Stiles' special reports, and the colored plates in subsequent sections.

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THE HISTORY OF THIS HERD AS AN INDEX TO THE FUTURE INQUIRIES.

His Excellency, Governer Baker, of Indiana, through Captain James Park, who served as the agent in the inquires in that State, and Dr. J. G. Orton, Assistant State Commissioner of New York, and subsequently in charge of affairs at Campville, on the Erie railroad, as soon as the desired inquiries could be made, filled up every link in the history of this herd, and early in September communicated the facts as follows:

[*Copy.*]

INDIANAPOLIS, *September* 4, 1868.

E. HARRIS, M. D., *Corresponding Secretary Metropolitan Board of Health:*

DEAR SIR—In reply to your communication of the 15th ult., making inquiry and desiring information concerning the cattle disease, I have the honor, by direction of the Governor, to transmit herewith a copy of a report made to this department by Captain James Park, of Warren county, Ind., upon the subject

Respectfully,

(Signed) JOHN M. COMMONS, *Private Secretary.*

[*Copy.*]

WILLIAMSPORT, IND., *August* 31, 1868.

To His Excellency Governor BAKER:

As requested by your letter of the 22d inst., I herewith transmit such a report of the facts in regard to the cattle disease as I think will meet the inquiry of the Metropolitan Board of Health.

On the 27th day of April, 1868, a herd of nine hundred and thirty Texan cattle were purchased at Colorado county, Texas. They were driven to the mouth of Red river, a distance of about six hundred miles, reaching that point May 31st, 1868.

They were at once shipped from that point on steamboats, and arrived at Cairo, Ill., June 4th, 1868. From thence they were shipped on the Illinois Central railroad, and reached Tolono, Ill., June 7th, 1868. From this point they were driven into Warren county, Ind., a distance of about sixty miles. They came into the western boundary of Warren county on the 12th June, 1868. There was a loss of forty-four head, only eight hundred and eighty-six of the nine hundred and thirty head reaching Warren county. These cattle were from four to six years old, all apparently in good condition, nothing indicating any disease whatever. There were "ticks" on very many of them. This herd is still at the present date in Warren county, Ind., all doing well, and no disease whatever having made its appearance among them; not one has died, notwithstanding more than five hundred native cattle have died all around them. This herd of Texan cattle, on the 12th day of June, 1868, passed over a certain piece of prairie pasture on the western boundary of this county (Warren). On the 19th day of June, 1868, a lot of native cattle, numbering ninety-five head, averaging over thirteen hundred pounds each, were permitted to graze upon the same pasture, and continued to feed upon the same until the 4th of August, 1868. One of the herd was noticed to be sick on the 28th of July, 1868, and up to the 4th of August, 1868, eleven

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were sick and three had died. On the 4th of August, 1868, eighty-four of this lot of ninety-five were driven to the West Lebanon railroad station, on the Toledo and Wabash railroad, and shipped for the New York market. This is, I presume, the herd of sick cattle referred to in Dr. Harris' letter. There were eleven head of another lot that had not been on this pasture, or in any way exposed to Texas cattle, shipped with the eighty-four—none of the eleven head were taken sick on the road to New York, but the sickness was confined to the eighty-four head exposed to the Texan cattle; at least had herded upon pasture passed over by Texan cattle.

On the night of the 12th of June, 1868, this lot of Texan cattle herded on another piece of prairie where a lot of one hundred head of native cattle were feeding. On the morning of the 13th of June, the Texan cattle were driven to the north of the county. Fifty-five of the one hundred head of native cattle were three years old, the rest were one and two, all in good growing condition. On the night of the 12th of June, 1868, there were twenty-six head of native fat cattle in an adjoining enclosure to the ground occupied by the Texan cattle. About four weeks after the 12th of June, these twenty-six fat cattle broke out of their enclosure, and grazed upon the prairie where the Texan cattle had been on the night of June 12th. On the 29th of July, one of these twenty-six was discovered to be sick, and died on the night of July 31st. On the 1st day of August, two of the one hundred had died, and some twenty-five more were sick. From that time up to the present, the entire herd have been taken sick; eighty-eight head out of the one hundred have died; twenty-two out of the twenty-six have also died; total, one hundred and ten out of one hundred and twenty-six. The remaining sixteen head have all been sick, and are now very poor and stupid, but have the appearance of getting well.

As a fact, wherever native cattle have passed over ground where this Texas herd have been, the native cattle have sickened and died. It is also a fact that other Texan cattle have been brought into this county; have been herded with native cattle for two months, and as yet no disease has made its appearance. We have had over four thousand head of Texan cattle in this county this summer.

* * * * * * * * * * *

I have the honor to be,

Very respectfully, your obedient servant,

JAMES PARK.

Concerning the lot of cattle which Captain Park mentioned as having been shipped from the West Lebanon railroad station on the evening of August 4th, the following note was received from Assistant-Commissioner Dr. J. G. Orton, of Binghamton, N. Y., soon after he assumed the duties of his office:

* * * On the 9th of August last, from a lot of five (5) car loads of cattle shipped from Buffalo, consigned to J. M. Thomas, and yarded off at Campville for feed and rest, seven (7) had died, it is supposed, from the then prevalent cattle plague.

Eleven others, exhibiting clearly developed symptoms of the disease, were detained and enclosed in a yard by themselves. These all died in about three days. The survivors went through to Bergen cattle market in the usual course.

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The eleven diseased cattle, I am informed, all manifested the usual symptoms of the plague, namely, rapid pulse, loss of appetite, head turning or drooping to one side (*torticollis*), discharging mucus from mouth and nose, urine bloody, and finally, inability to walk or stand alone. As these cases occurred several days previous to my appointment as assistant-commissioner, I had no opportunity, I regret to say, of making any examination of the bodies. They were hurriedly buried in trenches just outside of the cattle yards.

Very respectfully yours,

(Signed) J. G. ORTON, M. D.,
Assistant-Commissioner of the State.

BINGHAMTON, *Broome County, N. Y.*

It will be noticed that in the three separate accounts which we have here given concerning the herd of farmer Thomas, of Warren county, Ind., there is not only entire harmony in every particular as regards the statistics and movements of this herd, but also as respects the sickness that befell the infected cattle. This herd numbered eighty-four head, Captain Park informs us, when they left Indiana; they filled five transport cars and part of a sixth (the remaining space of the sixth car being occupied by eleven cattle that had not before been exposed to the disease, says Captain Park). At the Bergen cattle yards, near the Hackensack river, on the morning of August 11th, Commissioner Stephen Smith, Dr. Harris and Dr. Morris found sixty-six cattle, just arrived, in the care of the same Mr. Thomas, and no less than fifteen of this number were then sick. The eleven cattle mentioned as uninfected by Captain Park, and that occupied a part of the sixth transport car, were all living, healthy, and were quickly sold for sound and healthy beeves. Finally, Commissioner Orton's letter shows that eighteen out of the eighty-four cattle which the owner, Mr. Thomas and Governor Baker's State agent, Captain Park, separately aver to have been exposed to the infection of Texan cattle, died in the course of four days at the Campville herd-yards, on the Erie railroad. Of course but sixty-six survivors remained, and these were hurried onward to the New York market on the 10th of August, and were the next morning seen in the condition just mentioned.

In regard to any or all the points in a record so clear and well stated as this is, no comment can add anything to the strength of the argument which every intelligent person will discover in it. We would simply call attention to the fact that the record given by Captain Park concerning the herd shipped from West Lebanon, on the Toledo railroad, the statement given by farmer Thomas, the owner of the cattle, who came on with them, and who gave us

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the information personally in the yards where his cattle were dying, near Hudson City; and the record of events connected with this herd at Campville, and elsewhere on the Erie railroad, harmonize with and verify each other in every particular. And it should here be observed that in this instance as in others, to be noticed in Dr. Morris' report, there is ample presumptive proof that owners of infected herds, and particularly the speculators who dealt in such stock, regarded a hurried transportation to the New York market as the shortest and surest way to avoid the losses liable to be incurred by keeping such cattle for a day longer than their circumstances compelled them to keep them.

FIRST CASES OF THE CATTLE DISEASE SEEN IN THE METROPOLITAN DISTRICT.

Two weeks subsequent to the occurrence of these events, it became known to the Board of Health that a small herd, eighteen in number, which had left West Albany, July 28th, in charge of Mr. Stephen B. Reynolds, their owner, and which arrived at Peekskill by the Hudson River railroad, July 29th, and at Sing Sing by overland driving, July 30th, proved to be infected with the Texas cattle disease. They were Illinois cattle, and had been purchased for immediate home consumption at Sing Sing and the neighboring villages. Mr. Reynolds sold four to Mr. B. G. Tompkins, a butcher at Sing Sing, and five others to Messrs. Raymond & H. J. Sarles, also butchers at Sing Sing, and four to Mr. Wright Tompkins, a butcher living east of Sing Sing, and the remaining five of this herd Mr. Reynolds drove to his own farm in the town of Somers, eight or ten miles east from Sing Sing. The circumstantial history of this herd is correctly and briefly given by Dr. George J. Fisher, the Sanitary Inspector of the Metropolitan Board of Health for that section of the metropolitan district:

[*Copy.*]

ELLIS PLACE, SING SING, *August 27*, 1868.

DR. E. HARRIS, *Corresponding Secretary and Registrar, M. B. H.*:

SIR—I deem it my duty to make a brief report of the facts concerning the introduction of diseased cattle into Westchester county. On the 28th day of July, Stephen B. Reynolds, a cattle dealer living in the town of Somers, Westchester county, purchased eighteen bullocks of a cattle dealer in Albany, N. Y., being a portion of a lot of cattle said to have come from Illinois. These eighteen bullocks were immediately sent to Peekskill, N. Y., on the cars of the Hudson River railroad, whence they were driven directly to Sing Sing, a distance of twelve miles. On arriving at the latter place (July 30th), the owner, Mr. S. B. Reynolds, sold

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four of the cattle to B. G. Tompkins, a butcher in Sing Sing; five to Charles Raymond and H. J. Sarles, also Sing Sing butchers; and four to Wright Tompkins, brother of B. G. Tompkins, who is a butcher living east from Sing Sing. The remaining five Mr. S. B. Reynolds drove to his own farm in Somers. Within two or three days after their arrival, Raymond & Sarles slaughtered three of their five cattle and sold the meat in Sing Sing, as they allege, not suspecting the cattle to be diseased, and still believing them to have been sound and healthy at the time they were slaughtered. Mr. B. G. Tompkins also slaughtered one of his four cattle about the same time, and sold the meat in his market; his butcher says he did not observe anything to be the matter with the bullock, and believes that he was not diseased.

The first thing which aroused the suspicion of the butchers was, that on the 4th day of August, S. B. Reynolds brought to Sing Sing and offered for sale to the butchers, the quarters of one of the bullocks which he had driven to his own farm, and stated to the Sing Sing butchers that the bullock was found cast in, or near a brook in his pasture, and supposing the animal had received some mechanical injury, slaughtered it and brought the meat to Sing Sing for sale. He first offered it to B. G. Tompkins, who refused to purchase it; next to H. J. Sarles, who also declined buying it; after which he took it to Croton (where a number of laborers are engaged in bricklaying), but finding no purchasers he returned to Sing Sing and asked Sarles to allow him to leave the hindquarters in his ice-room; this being granted he took the forequarters to the camp-meeting grounds, and offered to sell them to Mr. George Worden, the only person authorized to sell meat to the camp-meeting people, who also declined purchasing the meat.

While Reynolds was yet engaged in seeking a purchaser for his "injured beef," Mr. William Dubois, a farmer, two miles northeast of Sing Sing, came to the village and informed G. B. Tompkins that one of his cattle was dead, and the remaining two were sick on his premises, where they had been driven after they were purchased of Reynolds. This information at once convinced the butchers that they had diseased cattle on their hands, and that Reynolds' beef, which he had been hawking about, and fortunately had found no customer for, was "diseased meat," and that this bullock had been cast by the plague and not by accident. Sarles immediately took the responsibility of having the hindquarters of Reynolds' beef taken from his ice-room and thrown into the mouth of the Croton river, and immediately informed Reynolds of the course he had taken, whereupon Reynolds buried the remaining forequarters in the offal heap at Raymond's slaughter yards, a mile east of Sing Sing, and thus the diseased meat was disposed of.

I have now accounted for five of the eighteen cattle; the remainder are accounted for as follows:

August 3d.—One died at Dubois' farm, belonging to B. G. Tompkins (already mentioned).

August 6th.—Wright Tompkins found two dead in his field, and S. B. Reynolds found one nearly dead, and had it killed for post mortem examination by Mr. Edward Underhill, a scientific farmer and an expert.

August 7th.—Another died at Dubois' farm, belonging to B. G. Tompkins.

August 8th.—S. B. Reynolds found another bullock dead in his field. B. G. Tompkins killed the last of his four, for examination by Dr. Collins and myself. The bullock was nearly dead before he was knocked in the head.

For the remaining six I cannot account. S. B. Reynolds and Wright Tompkins had each two of them. Whether they are sick or well, dead or alive, I cannot tell.

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The two which were sick and remaining in possession of Raymond & Sarles, are said to have been given (August 19th) to William Elliot, a cattle dealer at Putnam county.*

Yours respectfully,

(Signed) GEORGE J. FISHER, M. D.,
Assistant Sanitary Inspector, M. B. H.

The extracts from evidence on file at the chambers of the Metropolitan Board of Health, are introduced in this place to show the actual state of affairs connected with the movements and handling of infected beeves within the Metropolitan district. Prudential considerations, and a due regard for the mental tranquility of the people, made it expedient to say and do those things only, which would restrain the movement of infected cattle and utterly prevent the sale of the beef and viscera of the dying animals in the markets. These two great objects, we have every reason to believe, were accomplished very completely.

ORGANIZATION OF THE NEW YORK STATE CATTLE PLAGUE COMMISSIONERS.

On the 18th of August, the State commissioners, Messrs. Patrick, Gould and Allen, having assembled at Albany, organized a suitable plan for the inspection and control of diseased herds, wherever found within the State, and, as soon as their instructions had been promulgated, viz: on the 19th of August, the committee in charge of investigations for the Metropolitan Board of Health offered to make over to that commission all results and resources then at its command. But, as was ascertained by them in the course of a few days, there were no funds at the command of the commissioners that could be made available for carrying on such investigations. Moreover, the commissioners expressed, in very decided terms, their approval of the labors in progress under the Board of Health, and of their preference and desire that the board should independently carry forward all the inquiries which its officers had begun. Hence, the Board's committee saw no other course than that which they had commenced upon. But they earnestly invited the coöperation and advice of the commissioners. From the organization of the commissioners, until now, there has existed an entire and hearty unity of effort between them and this committee of the Board.

* A citizen of Sing Sing has since reported to this committee that these two sick beeves were sent down to our city markets.

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THE LABORS OF SANITARY INSPECTOR MORRIS, AS ASSISTANT COMMISSIONER FOR THE STATE.

During the first session of the State commissioners, August 18th, they appointed Dr. Moreau Morris as their assistant for the Metropolitan district. As they had immediate occasion for expert inspection, by him, at Millerton and Copake, in Dutchess county, Dr. Morris proceeded thither to make the desired observations and give the necessary orders. The circumstances attending the appearance of the Texas cattle fever, in Messrs, Smiths' herd of western bullocks en route overland from Albany, as detailed by Dr. Morris, are full of instruction concerning the subtle course of the infection and the usefulness of restrictions against the movement of infected cattle. The prompt action which was taken by Dr. Morris, in regard to the isolation and restraint upon all movements of that infected herd, had a very wholesome effect upon the public mind, in allaying anxiety, and upon the speculators and shippers of damaged cattle, in restraining them from such traffic.

It is no part of the design of this report to enter upon an examination of those abuses and frauds of the cattle trade, by which our meat-markets are continually exposed to the sale of diseased and injured beef; but there are a few points in regard to this matter which, as a sanitary inspector of the Metropolitan Board of Health, Dr. Morris investigated in the course of his inspection of the herds and butcheries, before he went up the railroad to Millerton, to arrest the movement of the sickly herd which is here mentioned. He had obtained evidence of the fact that sick cattle, when discovered in the herd-yards, are sold, slaughtered, and pushed forward to the meat-stalls of the markets as speedily as possible, and that this perilous business was, last summer, and it usually has been, in all probability, so adroitly managed, that, with the exception of the infected cattle found near Sing Sing by Dr. Fisher, no inspector of the Board of Health had succeeded in finding any animal affected with the Texas cattle disease within the Metropolitan district, previous to August 17th. Ample proof has been obtained that several cases of this disease had been witnessed by the herdmen in the city of New York, during August, and previous to the date here mentioned. Inspector Morris carried out, in the most admirable manner, the views which the Board of Health had authorized and directed its committee to publish on the 13th of August. And in the telegraphic orders which he received from the president of the State commission, he was "empowered and directed to carry out

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the suggestions of the Sanitary committee, as published in the New York papers."

Combining in one competent and already thoroughly experienced sanitary officer, the functions and authority of an assistant commissioner for the State, and the duties of a sanitary inspector under the Board, as was happily accomplished in the service of Dr. Morris, the proper inspection and police of all herds and herd-trains, and the timely care of all infected cattle, became certain. To provide for the constant inspection and sanitary supervision of the great herd-yards at One Hundredth street—the chief market for beeves in New York—he appointed Mr. Dayton, and with him he conferred daily at the yards; and, to meet the exigencies that might continue, until frost, in regard to the sales' yards on the New Jersey side, he appointed Mr. Taylor for Communipaw, and Mr. Newkirk for Hudson City and Hoboken, who, as the commissioned inspectors under authority of the State of New Jersey, and as commissioned agents for the State of New York, under Dr. Morris, reported to him all their transactions daily. Other inspectors and one expert detective were also employed by Assistant Commissioner Morris, in New York. With this simple and readily-managed organization, that officer has continued to maintain a sufficiently rigid and searching espionage upon the condition and movement of all cattle in the two cities. The Board's officers have, of course, given him whatever aid they could, and so, likewise, has the sanitary company of the Metropolitan police; yet it is due to this faithful and untiring assistant commissioner, that the fact should be stated in this place, that to his hearty devotion to the interests which the Board of Health required him to guard, and to his fearless and prudent discharge of his functions as an officer for the State, is largely due the successful execution of the plans of the board for both controlling and investigating the disease. He made it an invariable rule personally to inspect every infected herd, and firmly to apply the sanitary regulations which were advised by the Board and by the State commission. The methods and regulations which were adopted in his service are set forth in his report. It can with truth be stated that, in the administration of the duties of his position, he convinced all classes of men of the justice and good judgment of his acts. With habits of accurate medical observation, and with the trusty self-registering thermometer in his hands, he avoided error in his diagnosis and judgment concerning diseased cattle, and in every way he proved how vastly superior is the exact knowledge

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of the physician over the merely empirical kinds of knowledge and judgment to which the diseases and sanitary control of herds are usually committed.

THE DUTIES OF DR. R. CRESSON STILES AS PATHOLOGIST AND MICROSCOPIST IN THIS INQUIRY.

The two papers that are submitted in this report by Dr. Stiles, sufficiently explain the nature of his duties in connection with the investigations. But the actual amount of toil and care, the expenditure of time and study; the patient manipulations of specimens under his excellent microscopes, and the nice analysis of whatever pathological or other physical conditions were essential or constant in the diseased cattle, severely taxed the well sustained enthusiasm which he has for years displayed in the cultivation of physiological and pathological knowledge. He was present at the first series of post mortem inspections with his microscopes and re-agents close by the dying and freshly bleeding bullocks, for it was from the first deemed vitally important to exclude all possibilities of studying abnormal conditions of tissues and fluids that might after all be merely post mortem changes. He, therefore, attended at the slaughtering and post mortem inspections as often as he could; and, when absent from them the specimens to be examined microscopically and otherwise by him, were carefully inclosed in stoppered glass vessels, the stopper being washed with cresylic acid, and the specimens, thus guarded, being forthwith forwarded to him.

The scientific investigations which the Board of Health has encouraged the Registrar and Deputy Registrar to pursue during the past three years, rendered it easy for these officers to undertake a certain amount of inquiry in regard to this cattle disease, but had it not been for the unusual qualification of Dr. Stiles, the Deputy Registrar, for the pathological researches which were required, all the good purposes and desire for thorough investigation of the essential nature, causes a morbid phenomena of the cattle plague would have enabled the board and its medical officers to add but very little to the stock of useful knowledge. The Registrar states this fact with gratitude, and without in the least depreciating the value of any labors performed by other officers of the board.

This labor of Dr. Stiles has been continued from the 9th day of August to the 1st day of December, the first being the commencement of examinations in Mr. J. T. Alexander's infected herd

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at Communipaw: and the last being an examination of morbid specimens from two diseased Texas cattle that were taken off a train at Buffalo, and carefully dissected by Assistant Commissioners Morris and Mackey, in the presence of the State commissioners.

Bringing to these patient researches a well trained mind, with excellent experience and skill in the analytical study of healthy and morbid conditions of the animal organism, Dr. Stiles' aid in our investigations has been of the most indispensable character. And it must be regarded as particularly fortunate that in the absence of means for employing a special corps of anatomists and pathologists, the Board could obtain and use such skill as that of the gentleman here mentioned.

THE AID OF CHEMISTRY IN THE INVESTIGATION OF THE DISEASE. PROF. C. F. CHANDLER'S LABORS.

The excellent example of the Royal Commission in England for investigating the rinderpest in 1865–6, warranted the hope that analytical chemistry might bring out more definite results from the Texas cattle disease than had been attained even in the English researches. But as we were dealing with a blood disease, that had a much longer period of incubation of its infectious cause than the rinderpest has, and which also produces very decided alterations in the proximate and elemental constitution of the liver and some other viscera, it was thought best to submit the blood, bile and urine to the most exact analysis, in accordance with plans somewhat different from those which Dr. Marcet, the chemist to the rinderpest commission, pursued. Prof. Chandler has sufficiently explained the methods he pursued, in a note appended to the tabulated results which we present in this report.

Very great care was exercised in the taking and sealing of morbid specimens for chemical analysis, and the aid of chemistry was especially invoked in the cases that most emphatically declared the symptoms and uncomplicated phenomena of the disease. Wherever it was practicable, Prof. Chandler attended in person at the post mortem examinations, and with his own hand took the specimens and sealed them for his laboratory. In all cases the analyses were made as soon as possible after the specimens were taken.

Out of the whole number of these analyses, Prof. Chandler has selected for tabulation in this report only those in which his success in the entire process of treatment was most thoroughly perfect and unequivocal. By referring to the section in which

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these results are tabulated, it will be seen that there are fourteen (14) specimens of blood, nine (9) specimens of bile, four (4) of serum from the abdominal cavity (cases in which ascites and copious effusion had occurred), four (4) analyses of urine (black water), and four (4) analyses of the liver.

The exceeding nicety and skill which are required in the analysis of blood and bile, were appreciated and provided for by Prof. Chandler and his very skillful assistants in the laboratory. And, notwithstanding we did not at first venture to hope for very positive results from chemistry to aid in the pathological investigation which the Sanitary Committee of the Board of Health required to be made, it now is found, in the final summing up, that almost any other element in the pathological study could be spared or omitted—microscopy alone excepted—rather than to now omit the results that chemistry has independently contributed. We say independently, because the chemist was requested to ascertain all the essential constituents of the specimens submitted to him, and permit no errors or loss in his quantitative estimation, regardless of any ideas he might entertain concerning the disease.

We have requested the Professor to append the results of the analysis of healthy bullock's blood, as analyzed in his own laboratory, and also to place at the foot of his table of analyses the mean of all the results in the analysis of blood from fourteen healthy bullocks, also the result obtained by Wm. Marcet, Esq., for the English Commission in 1866.

It is hardly necessary to state to medical men, but it must be remarked for non-medical readers of this report, that the chief objects to be attained in all these analyses by the chemist to the board were: 1. To ascertain what changes in the proximate elements of the blood are found to characterize the disease, particularly as regards waste and deficiency in its solid constituents, and to point out what elements are so affected; 2. To ascertain the state of the serum found in cavities of the diseased cattle; 3. To ascertain in what respect the bile and the urine differed from those fluids in healthy animals; and 4. To ascertain the actual chemistry of the liver, and particularly as regards the percentage of fat in it in the chronic cases of the disease. In all this work chemistry is the aid and verifier of deductions reached by the different methods of microscopy and medical observation. Finally, in regard to the merit of Prof. Chandler's labors in this matter, we feel warranted in stating that for accuracy and definiteness, we know of no other

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series of analyses of bullock's blood, and of the other elements of the body in disease, that exceed the accuracy of the results which the chemist to the Board now contributes to this report.

THE SKETCHES OF MORBID ANATOMY BY MR. KOEHLER.

This work was begun on the 10th of August, the artist being conveyed to the place of slaughter, and, in all cases, when possible, completing his sketches in colors immediately upon slaughter and dissection. With but one or two exceptions, the specimens that are used to illustrate the chapters on pathology in this report, were sketched in this manner *when perfectly fresh and before any post mortem change, even in appearance, could have occurred.* The artist was strictly ordered to permit no deviation from nature in his sketches and colors. He has executed his task with exceeding faithfulness.

This artist, Mr. Robert Koehler, enjoys a just reputation for rare excellence in regard to truthfulness in anatomical delineation and coloring. His professional life having been spent in this kind of work, and Prof. Karl Bock's celebrated Atlas of Human Anatomy having been illustrated by his hand before he came to this country, he has continued to receive in New York the same confidence and patronage of the anatomists and pathologists that he enjoyed at Leipzig, where he was the assistant to Prof. Bock. As the value of these colored sketches of morbid anatomy of the Texas disease in cattle must depend upon their truthfulness and the freshness of the specimens they are made to illustrate, this introductory note is due to the Committee's report, and to Mr. Koehler, the artist.

SUMMARY OF THE EVENTS AND THE PROGRESS OF INVESTIGATIONS IN REGARD TO THE DISEASE.

As the details of all that relates to the arrival, inspection and care of infected cattle, are embodied in Assistant Commissioner Morris' report in the succeeding section, we need only state here, that in the prosecution of the Committee's duties in regard to the diseased cattle, it was necessary to give all possible aid to Dr. Morris in providing for the slaughter and post mortem examination of the cattle he condemned and ordered to be killed, or that were permitted to linger in quarantine until they died. It has also continued to be necessary, until December 1st, to maintain extensive correspondence to ascertain the history of herds and their movements connected with the manifestations of the disease; and it has also daily been necessary to take counsel together upon the results of these inquiries and the new events in the progress

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of the disease. Happily the contagious principle upon which the disease depends for its propagation in the North and West, has proved to be capable of repropagating itself only in a very limited and subtle way; but the very circumstances of this subtlety of the contagium has rendered it the more necessary to push on our inquiries and experiments the more assiduously while opportunity has been afforded. All of this labor may be briefly summed up as follows:

1. Every example of the disease within the reach of the committee of the Board of Health, or Assistant Commissioner Morris, has been promptly investigated; and, if the bullock was not recovering, the slaughter for post mortem examination of the animal was provided for; or, if already dead, the proper expert inspection was made by two or more officers of the board, Assistant Commissioner Morris being one of them. The total number of infected cattle and diseased carcasses so inspected and examined, between the dates of August 9th and December 1st, being between two hundred or three hundred. Upwards of forty (40) infected bullocks have been slaughtered and very minutely examined by this committee in a definite and scientific manner.

2. Unceasing effort has been made during a period of nearly four months to discover and inspect every animal suffering from the Texas disease within the Metropolitan district. Assistant Commissioner Morris during this period has inspected many thousand cattle, and he sought the counsel and aid of this committee daily.

3. All cattle found dead or dying from unknown or suspected causes in the city of New York, have been carefully inspected, and their internal organs examined under the direction of this committee.

4. By an arrangement with the Superintendent of the New York Rendering Company, a corporation that has the contract for gathering and disposing of all dead animals from the city, the dying and dead cattle that were daily conveyed to the rendering dock, were reported and examined. In like manner all information received by the superintendent there was at once communicated to this committee of the Board of Health.

5. Whenever a creature was found with this disease, the symptoms and progress of it were reported twice daily, and if brought to slaughter, all necessary preparations were made beforehand for taking and preserving specimens instantly upon killing the animal. No specimens were deemed suitable for analysis and for the artist's sketching unless obtained immediately at death, and brought under such study without delay.

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6. A series of experiments to test the morbid effects of bile, liver and muscular tissue, used with food, was made under the care of Dr. F. J. Randall, an assistant sanitary inspector connected with the Registrar's office. Dogs, rabbits and mice were the animals experimentally fed in this way. Other experiments also were made to ascertain the modes in which the infectious principle of the disease might be made to produce its morbid effects in healthy animals.

7. A series of special inquiries was made to ascertain the existence and nature of this infectious disease in freshly arrived Texas cattle; also preliminary inquiry upon this point, by extensive correspondence, was made before any of the Texan stock came under inspection of this committee and the Sanitary inspectors. The first of our inquiries upon this subject were addressed to Dr. J. H. Rauch, the sanitary superintendent of Chicago, and Prof. John Gamgee. After the lapse of about ten days, both these gentlemen replied by letter, the former from the Chicago stock yards, under date of August 22d, and the latter from Kansas City, under date of August 23d, assuring us that the disease had been found by them, respectively, in the Texas cattle at those places. Subsequent opportunities in New York enabled the Sanitary inspectors to verify the correctness of the conclusions that had been communicated to us by Dr. Rauch and Prof. Gamgee.

8. Experimental culture (by "planting") of the spores of the morbid bile and blood of the infected cattle was commenced in September, and continued until December, for the purpose of ascertaining the true nature of the fungus from which the spores are derived, that is, to ascertain the botanical characteristics and parasitical history of the cryptogam to which the spores that are found in the blood and bile belong. The chief results of these experimental researches are concisely presented by Dr. Stiles in the second part of his report.

9. By correspondence and inquiry, effort was made to ascertain if the contagium of the Texas disease is propagated, even occasionally, by the native Northern cattle; and, quite unexpectedly, contrary at least to very positive assertions as well as to the general rule, instances were found in which the disease has been transmitted by native cattle.

10. Finally, the evidences of health and disease have been very carefully studied by Dr. Morris ever since his labors commenced in August, and by several Sanitary inspectors during the latter part of Autumn, and, as far as time would permit, every week since the Texas cattle disease appeared in the vicinity of New York.

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II. REPORT ON SANITARY INSPECTION, REGULATIONS AND MEDICAL OBSERVATION.

BY MOREAU MORRIS, M. D.,
Sanitary Inspector M. B. H., and Assistant-Commissioner of the State.

Records Concerning Herds of Diseased Cattle that have come into the Metropolitan District, or under the Observation of Sanitary Inspectors of the Metropolitan Board of Health.

To the Committee of the Metropolitan Board of Health, for investigating the Texas cattle disease, and the State Commissioners for the prevention and control of cattle plagues:

GENTLEMEN: For more than four months my time has been exclcusively occupied with the observation, inquiries and sanitary regulations relating to the Texas cattle disease within the Metropolitan district, and wheresoever you directed my services.

My report to you consists mainly of records. They are records of events so interwoven with matters of historical interest concerning this disease, that it seems advisable to present this statement of my labors so consecutively as to be both complete in itself, and entirely convenient for reference from other branches of your reports respectively. It seems impossible in reporting to you the details and results of these labors so to discriminate the particular duties that were performed by me as an officer under the Board of Health, from the duties which I daily performed under the authority of the State commissioners and the special statutes relating to the cattle plagues, that it would be difficult for me to make a full and correct report, concerning either the former or the latter class of my duties, without at the same time actually recounting the entire history of events during this period of service; consequently this report is respectfully addressed both to the Board of Health and to the State commissioners. Were I to report to your honorable boards separately, the two reports would be in every respect identical in substance.

In making this report, the following order will be observed:

1. The date and leading events in the duties of each day.

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2. The record of whatever observations were made in the inspection of cattle, together with an account of whatever sickness occurred among the herds from day to day.

3. Such arrangement and classification of particular portions of these records as may be necessary for the convenient study of events connected with the disease.

4. Observation upon other kinds of diseased cattle in the New York beef market.

5. Remarks upon evils which were restrained and controlled and upon sanitary measures concerning cattle and beef in the New York market.

6. What is designed and what should be accomplished by sanitary inspection and control in regard to animals and meats offered in the Metropolitan markets.

7. What conclusions and results have been reached in my observations and experience in this work.

So far as the legal authority and influence of the Board of Health could be made available to meet the exigencies which occurred in consequence of the Texas cattle disease, the Board promptly exericsed that power and wielded that influence. The State commissioners for the suppression of cattle plagues have acted in the same spirit as that displayed by the Board of Health.

But it is a fact which seems to demand the attention not only of your commissions respectively, but also of the chief executive and the legislators of the State, that all the powers and the methods for procuring the needed sanitary inspection and control of market, cattle and meats, have been only temporary expedients. Systematic and skilled inspection, under adequate laws of the State, should be established as an essential branch of sanitary government.

On the evening of the 8th day of Aug., 1868, I received the following letter, directing immediate investigation and report upon the facts.

[*Copy.*]

E. B. DALTON, *Sanitary Superintendent Metropolitan Board of Health:*

DEAR SIR—Dispatches from Chicago indicate the existence of a cattle disease in the West, and intimate that some of the infected stock are on the way to this city, if, indeed, they are not already here. In the absence of other commissioners, Mr. Manniere and myself agree without delay one of your inspectors should be directed to repair to the districts where Western cattle are received, and to ascertain and report all the facts. It will require tact in the performance of this duty, doubtless, to find out anything in relation to this matter, as the interests of the butchers are all against any development of facts showing the presence of diseased cattle.

Yours truly,

(Signed) GEO. B. LINCOLN, *President.*

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Upon this letter from the President of the Board of Health was the following indorsement:

[*Copy.*]

Office Sanitary Superintendent,
Metropolitan Board of Health, *August* 8, 1868.

Respectfully referred to Sanitary Inspector Morris for immediate investigation, and report in writing or by telegraph if any facts be discovered which require it.

(Signed) E. B. DALTON, *Sanitary Superintendent Metropolitan Sanitary District.*

I immediately visited the National drove yards, located at One Hundredth street, between Third and Fourth avenues. There were but few cattle present, and found none sick.

The next morning visited the same yards again, and finding none sick, I joined the president of the Board, Drs. Harris and Stiles, in a visit to the abbattoir at Communipaw, where Mr. J. T. Alexander's infected cattle, which Dr. Harris had examined the previous day, were being slaughtered and thrown into the rendering tanks.

Here we found that one hundred and forty-one of Mr. Alexander's herd, which had left Homer, Ill., on the evening of the last day of July, were being sacrificed at the rendering tanks in order to avoid all risks and public injury that might result from keeping them for sale in the market yards.

A large number of these cattle were evidently sick, as indicated by the following symptoms:

Attitude: An arched or roached back; head carried low down; ears drooping; eyes staring, with a dull, glassy appearance; gait tremulous, and staggering in the hind quarters; the fœces hard, streaked with blood; urine copious, and bloody in appearance (*hæmaturia*); pulse, in the most marked cases, was found to be at about eighty, thready, and in some of the animals almost imperceptible; the respiration, in one marked case, was found forty in the minute—auscultation of the chest furnished no abnormal signs; the temperature of the rectum, in some of the most diseased, was found to be one hundred and seven degrees Fah.

A bullock in the last stage of the disease was slaughtered for thorough dissection, which was made by the medical gentlemen present. The following morbid appearances were noticed: The gastro-intestinal mucous membrane was marked by numerous ecchymotic patches; bile in abundance was found in the small intestines; the bladder was filled with bloody urine; the blood in a fluid condition, and imperfectly drained from the larger vessels;

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the muscles of a dark mahogany color, and unlike that of any normal and healthy flesh. Specimens of the morbidly affected tissues and fluids were taken by Drs. Harris and Stiles for analysis and microscopical examination.

Less than fifty of these cattle were slaughtered on this day (Sunday, the 9th August), and, by appointment, the medical officers who were present agreed to meet on a subsequent day and continue their dissection.

On Monday, August 10th, visited the slaughter houses located in Forty-fifth and Forty-seventh streets, near East river, found no sick cattle or diseased meat. Visited the Bergen cattle yards, in company with Assistant Inspectors Howard, Wadsworth and Winslow, where we found several hundred cattle, but none of them exhibited any signs of the disease; thence we went to Communipaw, where the slaughtering of Mr. Alexander's infected herd was in progress.

Mr. Lincoln, of the Board of Health, Gov. Marcus L. Ward and Dr. Harris were there by appointment for consultation. Several diseased cattle were inspected at slaughter; the temperature ranged from one hundred and seven degrees Fahrenheit down to one hundred and two degrees.* Information was received that evening that a herd of infected cattle belonging to a Mr. Thomas, would arrive at the Bergen cattle yards. Early next morning (Aug. 11th), accompanied by the Sanitary Commissioner, Dr. Stephen Smith, and the Registrar of the Board, I visited the Bergen cattle yards just mentioned, and there saw some fifteen sick bullocks of the herd of sixty-six that had arrived at that place from Warren county, Indiana. A full history of this infected herd being embodied in the committee's general report, I need not repeat any portion of it here.

* I owe it to the State commissioners to remark here that I have occasion to refer to the temperature records connected with my inspections of diseased cattle almost daily.

With much satisfaction and a justifiable pride, as regards the advanced and very practical application of the exact science of medicine and hygiene, I beg leave here to state the fact that soon after the organization of the Metropolitan Board of Health in 1866, Dr. Harris, the Registrar, furnished its library with the latest and best treatises on those epizootics and other diseases of animals used for food, and requiring the attention of sanitary officers, and that his office which is a bureau of hygiene, as well as of vital statistics, has always been kept supplied with self-registering thermometers to aid in the diagnosis and study of disease when required. In all their inspections, the officers engaged in the study of the cattle disease have never failed to have with them, their self-registering thermometers, as trusty aids to ready diagnosis. To Dr. Harris, for his thorough knowledge of hygiene and the collateral sciences, and to his habits of organization and thoroughness in the investigation of causes and results of disease, is mainly due the credit for the completeness of all this investigation and study of the Texas Cattle Disease.

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Four of these Indiana cattle were carefully examined as to symptoms. The following points were noticed: General external appearance; coats rough, heads hanging low down, eyes staring and dull, ears drooping, gait staggering, with tremor of flank muscles; fæces hard, small, covered with bloody mucous, urine dark and bloody; pulse one hundred and ten per minute, soft and feeble; respiration rapid, temperature at rectum one hundred and four to one hundred and nine degrees Fahrenheit. From one of these sick bullocks, bloody mucous was issuing from the nostrils. Three of the cattle were suffering from delirium, and though apparently frantic, were too feeble to do injury; they stood pressing their heads firmly against each other, or against the fence, their nostrils resting on or near the ground. The first figure seen on the right of plate No. 1, shows the appearance presented by the feeblest one of these delirious cases; the sketch was taken on the spot on the 13th August.* The muscles of the neck in one of these animals were exceedingly rigid on one side, and relaxed on the other, producing a kind of torticollis. The top of the head and base of the horns had an excessively high temperature. Professors Busteed, Liautard and others of the Veterinary College of New York, having arrived during this examination, and requested the privilege of selecting one of the sick animals for their own experiments, they were cheerfully permitted to take their choice.

Mr. McPherson, the superintendent of the yards, volunteered the information, that the residue of the infected herd were securely isolated in a pasture near by, where they would be kept until the authorities of New Jersey decided what should be done with them.

August 12th. In company with Dr. Harris and Sanitary Commissioner Dr. Stephen Smith, visited the Bergen cattle yards. Eleven head of sick cattle from Thomas' herd were selected and placed in quarantine for observation. Three of these being very ill, temperature records were taken as follows:

		Fahrenheit scale.
No. 1. Mooley.	At 2 P. M.	107½ degrees.
No. 2. Brindle.	do	105 do
No. 3. Speckled.	do	107 do

*The signs by which the disease was characterized were deemed of sufficient importance to warrant the sketching and exact illustration of them by a good artist. This forethought of the committee was certainly very fortunate, for, notwithstanding the very extensive prevalence of this disease in the West, and elsewhere, these sketches which the Metropolitan Board of Health has preserved, are believed to be the only series in existence that is at all complete.

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Three others were in small yards, belonging to the same herd, one of which had a temperature of one hundred and ten degrees.

The fifty head, balance of the drove, were said to be placed in quarantine pasture near by, but were in fact, surreptitiously removed, no positive trace of them having yet been discovered.

On August 13th, I received instruction from the Board of Health, through the chairman of their committee on cattle disease, to coöperate with that committee, and to give my time to the special duty of studying the symptomatology and clinical history of this affection as it appears in the herd yards. These instructions directed me to devote all my time to this duty, to make accurate notes of my observations, and to follow the directions of Dr. Harris, in my work under the committee.*

On the same day visited Bergen cattle yards in company with Dr. Stephen Smith, Sanitary Commissioner, and Drs. Harris and Stiles, all of the Metropolitan Board of Health, and Prof. Liautard, of the Veterinary College of New York, Gov. Ward, of New Jersey, and Mr. Koehler, the artist. On arriving at the yards, discovered that but four remained of the eleven placed therein the day previous. The other seven had either died or been slaughtered, and removed, it was said, to the rendering tanks.

Those remaining, being in a dying condition, were immediately slaughtered and post mortem examinations held. Dr. Harris, who directed the scientific investigations, had the following observations made:

No. 1. *Mooley*. Weight estimated 1,500 pounds gross.

Blood flowing from the carotids; temperature, 106½° Fahrenheit.

Fat, very yellow, jaundiced.

Muscles, dark mahogony color.

Liver very large, fatty; weight, 23¾ pounds, softened.

Spleen very large, engorged with dark blood; weight, 9 pounds 2 ounces.

Kidneys, dark color, congested; weight, 4 pounds 6 ounces.

Heart, muscular tissue softened; weight, 5¾ pounds.

Gall bladder, distended, filled with dark, thick, flakey bile; weight, 3 pounds 10 ounces; bile, sp. g. 1.030; temperature, 86° F.

Urine, dark, bloody, about 1 qt.; sp. g. 1.035.

* This promptitude of action by the Board of Health in meeting whatever exigencies arise has proved the surest means of preventing popular anxiety as well as protecting the public health. It has justly been remarked by one of the officers of the Board that "experience in the Metropolitan district has abundantly proved that the best way to prevent both pestilence and panic, is to know and prepare for the danger." (Notes on Cholera Prevention; addressed to Jackson S. Shultz, President Metropolitan Board of Health. By Dr. E. Harris.)

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Colon, inner mucous coat, highly congested, with blood along the longitudinal rugæ.

Small intestines the same as colon.

Rectum, intensely congested, rugæ.

Bladder, inner coat covered with bright red puncta.

Lungs healthy; right weighed 7 pounds; left, 4 pounds.

No. 2. *Brindle.** In a dying condition; slaughtered.

Temperature of rectum, 106°; mouth, 106½° F.

Nostrils hot, moist; tongue pointed and retracted.

Blood of aorta at slaughter, 106°; sp. g. 1.039.

Fat very yellow, or greenish yellow color.

Muscles, dark red, mahogany color.

Liver enlarged, softened, fatty; weight, 27½ pounds.

Spleen engorged, softened to a pulpy mass; weight, 9¼ pounds.

Kidneys very dark; weight, 4¼ pounds.

Heart, muscular tissue softened; 6 pounds.

Gall bladder, distended, with thick, dark, flakey bile.

Bladder, distended, with about two quarts of a dark, bloody urine; sp. g. 1020; inner coat of bladder covered with bright red puncta.

Small intestines injected with bloody puncta.

Rectum, highly congested in longitudinal striæ along the rugæ.

Cœcum, inner surface covered with large ecchymotic spots.

Omasum, its leaves inflamed; dry, and contents hard.

Abomasum, highly inflamed, ulcerated in its pyloric extremity.

Posterior nares, slightly injected with bloody extravasation.

Brain, slightly congested.

Lungs, healthy; right, 5¼ pounds; left, 4¼ pounds.

No. 3. *Speckled.* Gross weight, 1,150 pounds; temperature of rectum, 107° F.; in a dying condition; slaughtered.

Blood of aorta, temperature 107½° Fahrenheit.

Liver, enlarged, engorged with blood, and softened.

Gall bladder, distended, with thick, dark bile.

Rectum, cœcum and small intestines highly injected with blood, forming striæ and ecchymoses along the margins of the rugæ.

Abomasum, highly congested, inflamed, and the pyloric extremity presenting large dark ulcers.

Kidneys, dark color, congested.

Bladder, filled with dark, bloody urine.

August 14th. Visited Communipaw. The five cattle that were reserved for observation and treatment, through the kindness of Mr. Fitch and the superintendent, Mr. Payson, were this day placed in a lot where they had access to salt meadow-grass, and were com-

* The appearance presented by the carcass of this animal is shown in plate 2, which was sketched by the artist as soon as the viscera were removed after killing the bullock. See plate 2.

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pelled to drink of the following mixture, which Dr. Harris had prescribed as an experimental remedy:

Carbolic acid, 12 ounces in crystals; glycerine, 4 ounces; bicarbs. soda, 12 ounces. Mix. *Directions*—Dissolve or mix one ounce in 3 or 4 gallons of water.

This was readily drunk by the steers.

The surface of the ground was liberally sprinkled with heavy oil of coal tar, mixed with sawdust.

August 15th. At Communipaw. The five cattle under treatment appeared evidently improving; they drank about two gallons of the medicated water during the past twenty-four hours.

An ox, which had been in the same yard with the infected herd, was found dead in another yard. He was examined by the State inspector, Mr. Henry Taylor, of New Jersey, and presented the same lesions as had been observed in the cattle dying of the cattle disease in Mr. Alexander's herd, viz: "dark yellow-brownish fat, muscles very dark red, bloody dark urine, enlarged liver, gall bladder filled with thick dark bile."

August 16th. This day, at Communipaw, one of the five under treatment was slaughtered for scientific investigation. The balance (4) appeared to be convalescent:

Temperature 102°.
Post mortem: urine clear, normal; sp. g. 1.020, acid.
Spleen somewhat enlarged and engorged.
Liver 11 lbs., somewhat softened, *fat* very yellow.
Kidneys slightly engorged, paler than normal.
Abomasum, mucous coat slight spots of congestion.
Rectum, congested along the rugæ.

August 17th. Visited National drove yards, One Hundredth street and Third avenue. Found an ox lying sick, unable to rise. Temperature 106°, breathing very rapidly, panting, pulse too soft and rapid to count. No owner or claimant. Sent him to rendering dock. A post mortem examination was made. Post mortem changes had so obliterated evidences of disease as to make the examination useless, except that there was abundant evidence witnessed to show that this animal had died of a putrid blood poison:

Liver, enlarged, softened; weight 16½ lbs.
Gall very thick, dark.
Bladder, 1 quart of urine, dark, bloody
Kidneys, perfectly disorganized.
Rectum gangrenous.
Spleen, an enlarged, engorged, pulpy mass.

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Abomasum gangrenous.
Fat greenish-yellow.
Muscles darkened mahogany color.

Found an abandoned cow on First avenue, between Second and Third streets, in a dying condition. On examination at the rendering dock, disclosed pleuro-pneumonia.

August 19th. Examined 720 head which arrived this morning at Bull's Head, in which lot were Mr. Pile's drove of 85 head, two of which were afterwards taken sick.

Received this day the following telegram from Albany:

[*Copy.*]

ALBANY, *August* 18, 1868.

To HON. GEO. B. LINCOLN, *President Metropolitan Board of Health:*

SIR—Be pleased to send to Millerton on the Harlem railroad, Dr. M. Morris, to act as assistant commissioner under and pursuant to appointment, under chapter 740, LAWS 1866. There are diseased cattle at Millerton, and Dr. Morris is empowered and directed to carry out the suggestions of the Sanitary Committee of the Metropolitan Board of Health, as published in Saturday New York papers in relation thereto.

(Signed) M. R. PATRICK,
Chairman of State Commissioners.

August 19th. I immediately, upon the receipt of the foregoing order, proceeded to Millerton, Dutchess county, N. Y., arriving at about 6 o'clock P. M. on the same day.

On the morning of the 20th inst., having learned that a part of the sick herd had been sent to New York the day previous, numbering seventeen head, sent telegram to head-quarters to have them seized, but it proved too late, as they had been disposed of and could not be traced.

At Millerton, found a portion of a drove of cattle belonging to A. W. and Nathaniel Smith, of 73 Washington avenue, Albany, N. Y. This drove originally numbered sixty-five head, and left Albany on the 9th August, traveling overland towards New York city. They appeared to be a mixed lot of cattle—Illinois, Indiana and others. On the 12th of August, twenty head of this drove were left at Copake, Columbia county; one of these died on the 17th August, after an illness apparently of about forty-eight hours. The symptoms, as described by eye witnesses, were the same as those I had observed at Bergen cattle yards and Communipaw, viz: head low down, ears drooping, arched back, great debility, staggering gait; would not feed, finally lying down, unable to rise until death supervened. He was deeply buried. On the 13th August,

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forty-five head of this drove arrived at Millerton, Dutchess county, N. Y., twelve miles from Copake. Of these on the 14th, two died; 17th, one, and 19th, one. Making the record of this drove thus far as follows: Five deaths—14th, two died at Millerton; 17th, two died, one at Millerton and one at Copake; 19th, one died at Millerton.

On the morning of 19th August, the owner fearing still greater loss, shipped seventeen head of the infected herd for New York by the New York and Harlem railroad, leaving twenty-four head at Millerton, and nineteen head at Copake.

Two of those at Millerton are looking ill, the remainder appear to be well, but all being a suspected herd, were quarantined to be retained until all danger had passed. The dead animals had been buried in a lot adjoining the pasture where the cattle were found. These two lots of land were therefore set apart as quarantine ground, and the following order issued to Mr. William H. Barton, of Millerton, who was placed in charge:

MILLERTON, DUTCHESS CO., N. Y., *August* 20, 1868.

To MR. W. H. BARTON:

SIR—You will please retain under your personal supervision, the twenty-four head of cattle belonging to A. W. and Nathaniel Smith, of Albany, in the two lots adjoining and belonging to the estate of Mr. John Campbell, where the cattle now are and have been pasturing. You will retain them for one month from this date, or until further order from the State commissioners or their assistants. You will not allow any cattle to come within one thousand feet of the quarantine ground. Provide them with plenty of salt and feed if necessary. If any are taken sick, confine them in a separate enclosure from those that are well. All animals of this herd that may die, are to be buried at least four feet under the surface of the ground, covered with lime or carbolic acid for disinfection. The lots where the cattle are, or have been, to be disinfected with carbolic acid.

By order of the State Cattle Commissioners.

(Signed) MOREAU MORRIS,
Assistant Commissioner.

Proceeding to Copake, Dutchess county, the same day, the balance of the drove were found, numbering nineteen head, upon the farm of Mr. E Van Benschoten. None of these presented any evidences of the cattle disease, but as they were a part of the infected herd, they were placed in quarantine. The same order (in substance) was issued to Mr. E. Van Benschoten as to Mr. Barton, at Millerton.

August 21*st*. Learning that there were sick cattle at Amenia, Dutchess county, I proceeded thither, and found upon the dairy farm

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of Mr. Abiah P. Baylis, that out of a herd of thirty, nine had died during the four previous weeks. This herd consisted of twenty-seven cows, one bull and one pair of oxen; of these, seven cows, the bull and one ox had died. Three cows and the remaining ox were found sick with pleuro-pneumonia, and the symptoms, as described by Mr. Baylis and the attendants, led me to conclude that those that had died, were all victims of the same disease. During the illness of these cows, their milk had been regularly sent to New York city for consumption. Orders were immediately given, under the authority of the Board of Health, as its inspector, that no more milk from the infected herd should be sent to New York city. The remainder of the herd were placed in quarantine, upon Mr. Baylis' farm, under the supervision of Dr. Desault Guernsey, of Amenia, for observation and report, and a copy of the same quarantine order left with him as was given to Mr. Barton. Five more of this dairy herd were subsequently taken sick, making nine head which were put under treatment; all these finally recovered.*

August 21st. Returning to New York city, I immediately instituted a thorough inspection of all cattle in the yards of the National drove yard, at One Hundredth street and Third Avenue, and continued such inspection daily as they arrived from any source.

August 24th. Two sick cattle were found at Bull's Head, in a drove belonging to Mr. S. D. Pile. These left Arrow Rock, Selene county, Missouri, on the 3d day of August, 1868, numbering 83 head, and crossed the Mississippi river at St. Louis; here the two sick ones were said to have been added to the drove, making 85 head in all. From St. Louis they were shipped by railroad to Buffalo, Albany and New York city, and arrived at Bull's Head on the 19th instant. On the 22d, these two were observed to be ailing, refusing food, and continued getting worse; but all knowledge of their illness was carefully kept from me until the 24th inst., when they were seized and placed in quarantine hospital, under obser-

* The treatment of these cases showed a remarkable result, viz: out of a herd of thirty head, eighteen were diseased; nine of these died before any treatment was instituted; the other nine all recovered under treatment.

The medical and hygienic treatment was as follows: The sick animals were placed in a small enclosure by themselves. Pure carbolic acid was placed in a large open-mouthed bottle, dissolved in water. This was held to the nostrils, and given by inhalation at short and repeated intervals. The heavy oil of coal tar, containing 70 p. c. of carbolic acid, was liberally sprinkled upon the yard where they were kept, thus presenting the fumes of the carbolic acid constantly. The feeding was low diet, plenty of water, salt, and out-door air.

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vation. Fifty head of this drove had been sold for slaughter, and I have no doubt, from subsequent information, that diseased ones were among them. Thirty-three head now remained. Of these, there were 17 head of Cherokee cattle, which did not exhibit any evidence of disease; they were allowed to be sold for slaughter. The balance of the herd, 16 native cattle, were placed in quarantine pasture, near King's Bridge, on the 25th August, where they were retained for four weeks, when, no further evidence of disease appearing among them, they were released.

August 25th. This day a post mortem examination of one of the diseased steers from Mr. Pile's herd was held. Present, Drs. E. Harris, R. C. Stiles, and B. Howard, Assistant Inspector,—all of the Metropolitan Board of Health. A valuation of $30 having been fixed upon, he was slaughtered:*

White steer, killed August 25th, 2 P. M., at One Hundredth street. Been obviously sick thirty-two hours:

Temperature rectum, 107¾° F.; respiration, 35; pulse, 76; nostrils, profuse mucous discharge, streaked with blood; anus appears dry and contracted; fæces almost natural; urine bloody; animal balances himself by strongly twisting its head and neck to the left.

Post Mortem Observations.—Temperature of blood, 107° F., reaction neutral; temperature of liver, 17 minutes after death, 106°, and in the middle of this organ, 19 minutes after death, 107½°; appearance of subcutaneous surface, healthy; peritoneal cavity, its fat intensely yellow, cavity contained a large amount of bloody looking serum; gall bladder, distended; bile, sp. gravity, 1.025, reaction neutral; urine, sp. gravity 1 009½, neutral; liver, healthy in color and consistence; weight, 18 pounds; kidneys, apparently healthy; weight of one, 1 pound 6 ounces; of other, 1 pound 7 ounces; spleen, 6 pounds 2½ ounces, dashed with large chemosis upon anterior surface, the entire tissue being much engorged and easily broken down; bladder, especially at the *bas fond*, covered with ecchymotic spots; small intestines congested, presenting a general dark blush, no spots; lymphatic glands, in cellular tissue liver-colored, intensely yellow in center, with dark green towards surface.

* Regarding the history of the two bullocks of Mr. Pile's drove, which brought his 16 other native cattle under the suspicion that took them into quarantine, it was ascertained that Mr. Pile had purchased them three weeks prior to my quarantine order concerning the herd. He had purchased these cattle at East St. Louis, for the purpose of filling a car, as before mentioned, and they exhibited no sign of sickness until two days before I saw them. As they appeared to him ailing, he endeavored to dispose of them surreptitiously, but fortunately they were discovered during inspection, and at once placed under quarantine restrictions. The presence of these sick cattle had already depreciated the value and interfered with the sale of the whole herd.

Facts which have since been communicated to the Board of Health, warrant the conclusion that these two sick bullocks of Mr. Pile's herd received their infection at or near the yards at East St. Louis, where he purchased them; hence, the period of incubation in them could not have been less than twenty days to the first appearance of obvious symptoms at the National drove yards.

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The temperature record of the second steer, belonging to Piles' drove, is as follows:

August 24th, 105½° F.; August 25th, 105°; August 26th, 104°; August 27th, 104°; August 28th, 103° (chewing cud); August 29th, 103½° (appeared dull, does not chew cud); August 30th, 103° (was bled this day one-half pint from the cervical vein); August 31st, 101°; September 1st, 101°; September 3d, 100½°.

August 25th. This day made report to the president and sanitary committee of the Board of Health, and to the State commissioners, through Gov. Fenton, as follows:

NEW YORK, *August 25th*, 1868.

To His Excellency Gov. R. E. FENTON,
and the State Commissioners on diseased cattle:

SIRS—I have the honor to report that two cattle were found sick with the cattle plague at the National drove yards, New York city, on the 24th inst., belonging to a drove of eighty-five head, which left Arrow Rock, Selene county, Missouri, on the 3d of August inst., owned by Mr. S. D. Pile, of the aforesaid place.

The two steers, now sick, were bought in St. Louis ("to fill a car") and came through with the drove by railroad by way of Buffalo and Albany. They arrived in the National drove yards 19th inst.

Fifty head were sold immediately upon arrival, leaving thirty-three head; of these, seventeen head were Cherokees; they were selected out and allowed to be sold. Sixteen head of native cattle were removed from the yard to quarantine pasture, which I selected, near King's bridge, on the "Dyckman estate."

The yards have been thoroughly disinfected.

August 25th. To-day held a post mortem examination upon one of the two sick from Mr. Piles' drove, at which were present Assistant Commissioner Orton, Drs. E. Harris, R. C. Stiles, B. Howard, all of the Board of Health. The evidences of the disease were well marked.

In order to prevent the surreptitious movement of suspected and diseased cattle from the National drove yards, I have this day quarantined the whole of the yards, and ordered that *no* cattle be allowed to leave them without a proper inspection and permit, signed by the Assistant Commissioner.

The paramount necessity of protecting the public health, as far as possible, with the advice of the president of the Board of Health and its officers, have induced me to take this decided action with reference to this point.

Hoping it may meet your approval, I remain, respectfully,

Your ob't serv't,
MOREAU MORRIS,
Assistant Commissioner.

The following quarantine order was issued this day upon Messrs. Allerton, Dutcher & Moore, of the National drove yards, New York city:

NEW YORK, *August 25th*, 1868.

Messrs. DUTCHER, MOORE & Co., *National drove yards:*

GENTLEMEN—By virtue of the powers conferred upon me as Assistant Commissioner of the State of New York, in the act passed April 20th, 1866, chap. 740, and

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amended April 19th, 1867, with reference to infectious diseases of cattle, I hereby designate the whole of your yards and enclosures, located between Ninety-seventh and One Hundredth streets, and Third and Fourth avenues, New York city, as quarantine grounds.

You are hereby enjoined from allowing any cattle to leave said quarantine grounds, without special permit signed by the Assistant Commissioner.

Respectfully,
MOREAU MORRIS,
Assistant Commissioner for the State of New York.

August 26th. Inspected this day, 1,486 head of cattle at Bull's Head, and made report to President Lincoln and Sanitary committee of Metropolitan Board of Health, as follows:

NEW YORK, *August 26th*, 1868

GEO. B. LINCOLN, Esq., *President Metropolitan Board of Health, and Committee on diseased cattle:*

For your information, with reference to the progress, control and investigation of diseased cattle, I have the honor to present the following statement:

Learning the fact that a large number of cattle were expected to arrive at the National drove yards, by way of the Hudson River railroad, at two o'clock this morning, and fearing that some might escape the proper inspection before being slaughtered, a request was made of your president for a sufficient force from the Metropolitan police to aid me in securing the inspection. This aid was kindly afforded by that department, and proved of great value, as no cattle arriving either at Hudson River railroad depot, or by Harlem River railroad, or any other inlet, have left the drove yards without a careful inspection. Measures had been taken previous to their arrival, under the authority conferred upon the Assistant State Commissioner, so that no cattle could leave the yards without such inspection and permit. Under this arrangement, I am happy to be able to say, that I believe no diseased cattle have escaped observation.

All that arrived at the drove yards underwent a personal inspection, and were found apparently in a sound, healthy condition. These numbered 1,101, and, with 393 which were yet in the yards from last market day, made a total of 1,494 head of cattle inspected this day. These cattle are from Missouri, Illinois, Indiana, Ohio, Kentucky, and this State; some of them from the Cherokee country.

One, which I have reasons for believing had been turned out of a slaughter-house near by, was found on the Third avenue, near One Hundred and Sixth street, very sick. He was placed in the hospital lot attached to quarantine, where he will be retained for observation.

The effect of this decided action, in the thorough inspection of all cattle arriving at this large depot for distribution, will be, that more care in the selection of droves, and the exclusion of any suspected of having disease, will be exercised at distant points. It will be very difficult to forward diseased cattle to this market by any of the usual routes from this time forth, as I learn by recent advices that at all the prominent stopping and feeding places competent commissioners and inspectors are constantly on duty.

Nevertheless, New York city presents so many exposed points at which cattle may enter and pass to the numerous slaughter houses scattered throughout the Metropolitan district, where unscrupulous persons are ever ready to seize oppor-

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tunities, and where it is almost impossible to maintain a thorough system of inspection either of cattle or meats, that I would respectfully and earnestly beg to offer the following suggestion: In order to be able thoroughly and efficiently to certify that no diseased meat either be slaughtered or offered for sale, the business of slaughtering must be confined to fewer points, and at such places as afford the largest facilities for thorough observation; that no meat be allowed to be sold without proper certificate of inspection.

In pursuing investigations with reference to this important subject, as respects the health of the people of this city and Brooklyn, most startling facts appear, and to my own mind afford a reasonable conclusion as to the variations in the death-rates, as furnished by your registrar from time to time.

Not only diseased beef, but other meats, as well as vegetables and fruits, must share the responsibility.

In order to secure the inhabitants of the Metropolitan district from the danger of purchasing diseased meats, it is *absolutely necessary not only that animals should be inspected upon the hoof, but that a more careful and thorough examination of internal organs, while being dressed for market, should take place.** It is a well known fact that a large proportion of the meat slaughtered and inspected under Levitical law for the the use of our Israelitish population, is condemned as respects its use by them, but sold at equally high prices for use by Gentiles.

Up to the present moment no new cases have been discovered.

Respectfully submitted,

MOREAU MORRIS,
Sanitary Inspector M. B. H.

To-day a red ox was found abandoned on Third avenue, near One Hundred and Third street, evidently dropped out of some drove going to Bull's Head, from the landing place on Hudson River railroad, at One Hundred and Twenty-fifth street. He was placed in quarantine hospital.

Temperature 106° F. Very feeble; feverish, with staggering gait; all the white of the eyeballs deeply jaundiced; tongue dry, nostrils dry, horns hot; is uneasy; lies down often.

August 27th. Temperature 105° F. The animal evidently sinking; unable to stand, dying, and at 8:30 he was dead; sent to rendering dock; examined within six hours, and found to present the well defined lesions belonging to the Texas cattle disease.

Another ox was taken to the rendering dock this day in a surreptitious manner, with the hope of not being discovered. This ox came from a slaughter house in Stanton street. An examination revealed the same cause of death as in the former case. This animal was purchased at Bull's Head on the 20th inst., during my

* Such inspection is now pursued at the Communipaw abattoir, under the authority of the State of New Jersey, by a competent and careful inspector, and it will at once tranquilize the public fear of diseased meat from that point, and secure a healthy supply.

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absence from the city, and had been kept in a dark shed near the slaughter house in Stanton street during the interval.

To return to the daily record of duties, I need to present in this place the results of post mortem examinations which were made upon the four remaining bullocks of Mr. J. T. Alexander's herd, which had become convalescent at Communipaw. One of the five sick bullocks which had generously been set aside by Mr. Fitch (the agent of Mr. Alexander), for the uses of the Metropolitan Board of Health in studying the disease, was slaughtered on the 17th, and results were observed which have been described in the general report by Dr. Harris. It remains to present in this place the post mortem inspection of the remaining four. They had been about fifteen days apparently convalescent, and had been three or four days very sick, with all the symptoms of the disease. Efforts were made to obtain temperature observations daily, but such observations were made with great difficulty, owing to their restless and wild state; yet on the 9th, 10th and 11th, the temperature was taken once or more daily in the rectum of each one, and was found to average about 105° F.; but in no one did it reach 107° F. The post mortem dissections of these four bullocks commenced at 2 P. M.

These four bullocks were seen to exhibit the usual symptoms of the Texas disease at the first and second visits which the medical officers made to the yards at Communipaw, viz: on the 8th and 9th of August. The lopped-horn steer, which was slaughtered on the 16th, was, at the former dates, believed to be rapidly approaching a fatal result, but these four others were only then beginning to exhibit symptoms. They had been carefully fed, and in their drink each of the bullocks had taken a little more than half a drachm of carbolic acid (Calvert's best chrystalized) in two thousand parts of water, as before mentioned.

Record of Post Mortem Examinations.

Steer No. 1. Temperature of blood, 103°; thirty-two ounces coagulated firmly in twelve minutes.

Temperature of liver, 102° in center of right lobe, fifteen minutes after death.

Urine, specific gravity 1.009, clear, slightly alkaline; no albumen.

Fæces thin, but natural.

Lungs healthy.

Liver healthy; weight 12½ pounds.

Gall bladder healthy.

Abomasum, over a large space, signs of recent great congestion. All this part had a whitish appearance, as if the congested membrane had been recently acted

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upon by carbolic acid. There were two or three superficial ulcers scattered about, having the same appearance, as if almost healed. This whitish appearance was not attributed by the gentlemen present to the action of the carbolic acid which the animal had swallowed while under treatment; it was considered, rather, to consist of epithelium scales cast off during the progress of the reparative process which seemed to be rapidly advancing.

Steer No. 2. Temperature of blood, 103½° F.
Temperature of liver, 15 minutes after death, 101½°.
Urine, specific gravity, 1.022; alkaline; contained a good deal of albumen.
Kidneys remarkably healthy.
Heart healthy.
Liver weighed 15½ pounds.
Abomasum suffused with a moderate blush, and sprinkled with miliary white patches.
Mucous membrane darkly *eroded* in small patches, but evidently healing, in pyloric extremity.
Rectum shows signs of recent congestion, but seems now very nearly natural.

Steer No. 3. (A tall, lean animal.)
Temperature of the blood at death, 103½°.
Temperature of middle of liver, 15 minutes after death, 103 75-100°.
Urine, specific gravity 1.025; neutral, inclined to alkaline.
Kidneys healthy.
Liver weighed 13 pounds.
Spleen weighed 4 pounds, being engorged and enlarged.
Stomach and contents in good condition.
Rectum gives evidence of recent congestion of great extent, which now is quite limited.

Steer No. 4. Temperature of blood 103½°; coagulated in 15 minutes.
Temperature of right lobe of liver, 15 minutes after death, 103½°.
Urine, specific gravity 1005; neutral, or slightly alkaline; no albumen.
Liver weighed 11½ pounds.
Spleen weighed 3½ pounds; much engorged and slightly softened.
Abomasum shows evidence of recent disease; the papilæ much enlarged at valvular portion.
About three inches from pylorus are seen recent and deep erosions cicatrizing.

August 28th, 29th and 30th. Inspected cattle at Bull's Head, as usual. None found sick.

Early in the morning of the 30th, Dr. Harris, and Prof. Copeman, a veterinary surgeon, joined me at the National drove yards, for the purpose of taking specimens of blood from the cervical veins of the remaining sick ox of Mr. Pile's herd. The temperature that morning was 103° Fahr. Four vials, containing two ounces each, were taken. The result of the analyses, as given by Prof. Chandler, can be seen in the general report. This animal seemed to improve temporarily after the loss of this small amount

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of blood, for his temperature on the subsequent morning was found to be 2½° lower.

August 31st. The following notice was issued in the morning papers of New York city:

TO DROVERS AND BUTCHERS.

Under the authority conferred by the laws of the State of New York, enacted April 20th, 1868, chapter 740, section 9, I hereby order and direct, that all beef cattle and cows landing or arriving within the limits of the city of New York, be yarded at the quarantine yards, One Hundredth street and Third avenue, Eleventh avenue between Fortieth and Forty-first streets, city of New York, there to be properly inspected. All cattle found traversing the streets of this city, without a permit signed by the Assistant Commissioner, will be seized and taken to the quarantine yards for inspection, unless so far diseased as to require other disposition. This order to take effect on and after Wednesday the 3d day of September, 1868.

(Signed) MOREAU MORRIS,
Assistant Commissioner.

The following supplemental order was issued on the 3d September, 1868:

NOTICE TO OWNERS OF MILCH COWS.

A temporary quarantine yard is hereby established for milch cows at Chamberlin's yards, Nos. 70, 72 Robinson street, where they will be inspected daily, and permits given.

Blank permits were provided, of which the following is a copy:

No. .... , NEW YORK, ... 186 .

I hereby certify that I have inspected ..... head of cattle belonging to..... and allow them to leave quarantine yard.

.....,
Assistant Commissioner.

These were furnished whenever cattle left the quarantine enclosures, and proved to have been of the utmost value as time progressed.

Finding that cattle were surreptitiously taken to slaughter houses without the proper inspection upon the hoof, on the 31st August, 1868, the following communication was addressed to the President of the Metropolitan Board of Police through the President of the Metropolitan Board of Health:

HON. THOMAS C. ACTON, *President Metropolitan Board of Police:*

SIR—Deeming it essential to secure the support and coöperation of your police force in order to enforce the provisions of the order herewith enclosed (notice to drovers and butchers), which I find necessary to issue to secure a proper inspection of all cattle entering this city, that the spread of infectious disease among cattle, and the sale of diseased meat for food, may, as far as possible, be prevented,

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I would respectfully solicit of your honorable board that an order be issued to its officers, that all cattle found traversing the streets of New York city, without a permit, signed by the assistant commissioner, be seized and brought to the quarantine yards for proper inspection.

Having found by actual experience during the past week that it is impossible to secure a proper inspection of cattle, arriving at the market, under present circumstances, and from the well ascertained fact that many diseased animals are taken to slaughter houses without proper inspection, I am compelled, by the great responsibility which is imposed upon me under the law of the State Commission, and by the requirements of the Board of Health, as its officer, to take such measures as will secure, as far as possible, a proper guarantee that no infectious disease shall spread among cattle, and that diseased animals shall not be slaughtered for food in this city.

Your coöperation to this end is therefore earnestly and respectfully solicited.

An early reply is desired, that prompt and decisive measures may be taken.

Very respectfully,

Your obedient servant,

MOREAU MORRIS,

Assistant Commissioner for New York State.

The Metropolitan Board of Health, on the 2d September, 1868, at a regular meeting, adopted the following:

Whereas, Assistant Commissioner Dr. Moreau Morris has found it necessary to establish two quarantine yards in the city of New York, for the purpose of securing the needed sanitary inspection of all cattle arriving within the city limits:

Resolved, That the Metropolitan Board of Health hereby expresses its unanimous approbation of this official action of Assistant Commissioner Morris, and requests the Metropolitan Police Commissioners to enforce strict obedience to the orders and regulations which Dr. Morris has established concerning such quarantine inspection.

September 1st. At Bull's Head inspected 511 head of cattle. In one drove of 27 head, belonging to Mr. Wm. Thompson, from Illinois, there was a sick ox; he was removed to hospital, and kept under observation for several days, until he recovered and was discharged.

September 3d. Commissioners Gen. M. R. Patrick and J. Stanton Gould, and Assistant Commissioner Dr. Manlius Smith, their secretary, met Dr. Harris and myself for conference, and on the 4th visited Communipaw (New Jersey), and the New York Rendering Company's dock, and terminated the day at National drove yards, One Hundredth street, where we slaughtered and dissected the remaining ox of Pile's herd. Present at the post mortem examination: Drs. Harris, Stiles, Chandler, Howard, and Mr. Kohler the artist, besides the Commissioners and Assistant Commissioner before mentioned.

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This animal had seemed to be but lightly attacked. The bloody urine, staggering gait, and increased temperature being the main evidences of disease during life, while the chief evidence of disease, as discovered at post mortem examination in this case, consisted in the deep discoloration of the muscles and the fat; the presence of extensive erosion and sloughing in the pyloric portion of the fourth stomach, and in the usual conditions which have attended this disease in the lesions of the liver and spleen; and most of all, in the microscopical evidence which had been obtained on the 30th of August, from blood drawn from the cervical vein and examined by Dr. Stiles; also, the blood taken at the time of slaughter.

September 9th. There arrived at Bull's Head, a car-load of 19 head of cattle, from Illinois, bought by Baker, at Albany, and shipped to care of Bright & Fagan. The whole lot not appearing well, were placed in quarantine hospital. The temperatures of all were taken.

At 3:30 found an ox from this car-load unable to rise, presenting the prominent symptoms of the cattle fever: head drooping near the ground; eyes staring, dull; horns cold, body hot, breathing rapid; pulse very feeble, unable to count it; coat rough, flies adherent, temperature of rectum 106½° F. Killed at 6:30 P. M. same day at rendering dock.

Temperature, 105½°.

Temperature of blood at slaughter, 103°.

Temperature of liver, 15 minutes after death, 106°.

Bladder contained 30 ounces of "black water;" much distended; mucous surface of neck of bladder odematous; inflamed.

Rectum contained small quantity of hard, rolled dung; the mucous membrane engorged with black blood; rugæ striated with blood.

Abomasum, whole inner surface a dark purplish color; pyloric extremity deeply eroded over about one-twentieth part of the surface; the erosions also found on the larger folds; the upper part of the intestine in a like condition.

Kidneys enlarged; color very dark; engorged with dark blood throughout.

Gall bladder distended, with thick, dark, ropy bile.

Liver weighed 23½ pounds, without fat or gall bladder; fatty, engorged with blood.

Heart large, flabby; blood extravasated between muscular and mucous surfaces

Fat a dark greenish-yellow color, without consistence.

Muscular tissue very dark mahogany color; soft and flabby.

On this date (September 9th), temperature observations were commenced upon this herd of Bright & Fagan's. (Mr. Baker, of Albany, is said to be the owner and shipper.)

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TEMPERATURE RECORD of nineteen head of Cattle shipped to care Bright & Fagan, 5th September, 1868, by Baker, of Albany, from Buffalo. Arrived at Bull's Head, N. Y., September 9th.

No.	Sept. 10.	Sept. 11.	Sept. 12.	Sept. 14.	Remarks.
1	102°	102°	101°	101½°	This lot of 19 head, losing one, were discharged from hospital on the 18th September, well.
2	102½	102	102	101½	
3	102½	101	101	101	
4	101½	102½	101	101	
5	102	102½	101	101	.....
6	102½	102	100	101	.....
7	102½	103	102	101½	.....
8	102½	102½	102½	101½	.....
9	103	104	101	101½	.....
10	103	103½	101	101	.....
11	101½	102½	101	101	.....
12	102½	102	101½	101½	.....
13	102½	102	101	101	.....
14	102½	102½	101	100½	.....
15	104	102½	101½	101	.....
16	102½	102	101½	101	.....
17	102½	102	101½	101	.....
18	.....	.....	104	101½	.....
19	107½	slaughter.	.....	.....	.....

September 11th. Mr. Dayton, the inspector, and myself, found at One Hundredth street, a bullock of the Bright & Fagan herd, with symptoms of the disease, bloody urine, &c. He was slaughtered at 4 P. M.

Record of Post Mortem.—Temperature of rectum before slaughter, 107° F. (Temperature at 9 A. M., 107½°.) Temperature of blood flowing from aorta, 107°; temperature of liver, nine minutes after death, immediately upon opening the abdominal cavity, and plunging the thermometer in the center of the liver, 108°; weight of liver, 18½ pounds; color of this organ, a mottled and ochrey coffee *au lait* color. Specific gravity of blood, 1.021; gall bladder excessively distended, and containing 3 pounds, 10 ounces of thick flaky bile; specific gravity of this fluid, 1.018. The spleen weighed 5 pounds, 2 ounces, and was ecchymotic in appearance, and almost diffluent in its substance. The kidneys weighed 1 pound, 8 ounces each.

September 12th. Early in the morning, police officers of the First precinct, telegraphed to Dr. Harris' residence, and to the office of the Board of Health, that twelve cattle had died during the night at Pier 12, East river.

Taking Capt. Lord, of the Sanitary squad, Dr. Harris proceeded to that pier, and to the steamer "Fah Kee," which lay on the north side of that pier, and on its outer end, and they there ascertained that fourteen bullocks had died on board or upon the dock, after being taken off the ship, during the night and morning. There were twenty-six remaining alive; these were being disembarked. It

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was immediately ascertained that this herd of forty fat bullocks had been purchased and driven down from One Hundredth street during the previous day (September 11th), and that they had been carefully put on board the "Fah Kee" before dark; that the portion of the ship in which they were placed was the main deck, forward of the engine; that they had been purchased by a Mr. Harvey, the contractor who supplies the Bermuda market, for use of the troops, &c., but that they had undoubtedly come from one or two droves recently arrived from some point west of Toledo *via* Buffalo.

The twenty-six surviving bullocks were ordered to be carefully driven to the Battery to remain until sunset, as the day was excessively hot.

I inspected these cattle at the Battery, and ordered them to be removed to Bull's Head during the cool hours of Saturday night and Sunday morning, and took steps immediately to discover whatever could be ascertained concerning the origin of the herd. Found that they came from Illinois in a drove of one hundred and eight head, brought by "Farlow," and the whole lot were bought by Joseph Williams and William Thompson, in Albany.

Before night of the 12th, fourteen head were dead, and during the following two days, three more died, making seventeen in all, dead out of the lot of forty head. The remaining twenty-three head were placed in hospital at Bull's Head until the 17th, when they were removed to quarantine pasture near King's Bridge, where they remained until 8th October (three weeks), when they were released, being entirely convalescent, and appearing to be well. On the 12th October following, they were sent to Bermuda, and arrived in good condition.

Post mortem examination revealed the cause of death unmistakably as being of the Texas cattle disease.

The following is a concise abstract of notes made in ten of the post mortem examinations which were held September 12th, 13th and 14th, upon the "Fah Kee" cattle:

No. 1. Dissected at 5 P. M., six hours after death. Died at 11 A. M., soon after being taken out of the vessel.

The temperature at 10½ A. M., as examined in the presence of Dr. Harris, half an hour before death, at pier 14, was 110° Fahr.

On post mortem examination, the spleen was found normal in appearance; weight, 1 pound 7 ounces. Urine, specific gravity 1.019. Weight of liver, with gall bladder, 14½ pounds.

No. 2. Weight of liver, without gall, 14 lbs. The spleen and kidneys were disorganized.

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No. 3. The paunch and diverticulum moderately filled with undigested materials. The omasum and abomasum nearly empty. The maniplies of omasum have perfect papulæ, but their blood-vessels are deeply injected throughout with extravasation of disorganized blood-vessels beneath the mucous membrane in several of these maniplies. The abomasum shows throughout the whole pyloric portion cicatrized ulcerations, but the membranes are so much altered since death that the full extent of these changes are not easily described.

No. 4. Exhibits more extensive erosions and recent cicatrices than No. 3. The abomasum was distended with black blood and some of the ordinary contents.

No. 5. Resembles No. 4 in every particular. Recent cicatrices covering the tubular portion of the abomasum from the pylorus back to the folds.

The kidneys of the whole three were in a state of diffluent decomposition. Two patches of the folding or omasal portion of the abomasum appear to have been gangrenous before death; deep ecchymosed if not gangrenous.

No. 6. Was like No. 3, in every respect.

No. 7. Is the red bullock seen alive by Dr. Harris at the vessel, and whose temperature at rectum was 108° in the moribund state, at 10½ A. M., yesterday.

Post mortem at 11 A. M., 25 hours after death. Stomachs in a fair state of preservation. The abomasum contained a small amount of ordinary material, and about a pint of thick, tarry blood. There were recent and partial cicatrizations and extensive erosions throughout the tubular portions of this stomach. The liver and kidneys were of a chocolate color, containing a little blood.

No. 8. Is the bullock Dr. Harris saw rescued from the water [into which it fell while being lifted off from the deck of the "Fah Kee"]. This bullock was slaughtered at the rendering dock, when in the moribund state. The temperature (immediately upon opening the abdomen), in the fat of the kidney, was 103°, and in liver, 103½°; the stomachs were moderately filled. The omasum showed no extravasated blood, but the epithelium peeled off readily at every point. The abomasum contained but a small amount of its ordinary material, and this was mixed with extravasated blood, or the coloring matter of the blood. The fimbriated or folding portion presented upon several of its margins and folds long patches, erosions, and sloughs, and throughout the entire circumference of the upper portion of the pyloric, or tubular section, old erosions partially healed or recently cicatrized, studded the surface. Specimens were saved.

September 14th. Slaughter and dissection of two that survived to this date.

No. 9. Steer from vessel (that had fallen out of drove at 14th st. at 11 P. M., Sept. 12th), killed at 4:45 P. M. Temperature of rectum just before slaughter 100½°. Temperature of blood at slaughter, 101½°. Temperature of liver, 15 minutes after death, 101½°. The rectum, commencing two inches from the anus, on its internal aspect, presents two deep ulcers; one extending five inches in the direction of the longitudinal rugæ; another extending about an inch. Weight of liver, 22½ pounds. Spleen engorged and enlarged, weighing 3 pounds.

No. 10. The steer from Robinson street (fell out of the drove when being driven up from the Battery, and was allowed to remain until this hour for slaughter). Liver, 22½ pounds. The abomasum contained patches of the characteristic erosions, some recent, and some nearly healed.

The tubular rugæ of rectum engorged throughout their whole extent.

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September 15th. During the inspection at Bull's Head this day, a sick steer was discovered in the drove belonging to Mr. P. F. Carey. Temperature of rectum, one hundred and seven degrees Fahrenheit. A valuation of eighty dollars, contingent upon conditions to be discovered, having been made, he was ordered to be slaughtered. The temperature record of this steer this day, was as follows:

8 o'clock A. M., 104° Fahr., at 1 P. M., 105°, and at 1:30 o'clock P. M., he was slaughtered in presence of several inspectors of the Board of Health, who had been detailed this day to make investigations in the slaughter houses, with reference to diseased animals and meats. Temperature of blood flowing from carotids, 106½° F.; of liver, fifteen minutes after death, 105½° F.

Post Mortem Appearances: Omental fat, brownish yellow; other fat, lighter yellow; muscular tissue, dark red.

Liver weighed 16½ pounds, and presented excessive fatty degeneration, engorged with blood, softened.

Gall bladder distended, with thick, dark flaky bile.

Urine normal.

Abomasum: upon mucous surfaces, dark, irregular shaped, elongated erosions, some in process of cicatrization, and upon the pyloric portion, several large cicatrices were seen, where the eroded surface had healed; spleen enlarged; weight 2½ pounds, congested.

Kidneys engorged with blood, color dark; weight of both, 5 pounds.

Rectum presented a few points of inflamed ruge.

Omasum, papilæ contracted; surfaces dry, filled with hard cakes of food.

September 17th, 18th, 19th, 20th. Inspected cattle at Bull's Head, and also made examinations at slaughter houses with reference to diseased animals, with the detail of inspectors of the Metropolitan Board of Health. The results of those inspections were reported to the Board of Health on the 22d day of September in detail.*

September 24th. A dead steer was sent to rendering dock from Bull's Head, that was found dead in the yard, having arrived from Albany the day previous. He was examined on the 25th at the dock.

September 26th. Quarantined sixty-nine head of Texas cattle at Bull's Head, owned by Henry Livingston, looking badly; some suspicion of disease among them. They were released on the 28th, finding none sick.

This day removed to hospital three steers, one white, owned by Westheimer & Myers; released on the 28th.

* An abstract of the report here referred to, is published in the report of the Metropolitan Board of Health for 1868. See Appendix.

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Same day, two more, red and white, belonging to Mr. D. Adler; white, released on the 28th.

Slaughtered a red steer at Bull's Head, owned by Mr. V. Samuels, valued at forty dollars. Also slaughtered another steer at same place, owned by David Adler.

The first steer had been sick in hospital for several days, and his temperature taken as follows (he had a persistent cough, dullness on percussion over the lungs with submucous rate):

Temperature Observations.

	Morn.	Noon.	Evening.
23d	105 °	.....	104 °
24th	103½°	104 °	104½°
25th	102½°	104½°	103 °
26th	103½°	Slaughtered.	

Temperature of blood at slaughter, 105° F.

Lungs adherent to pleura; pneumonia in both lungs; pleuro-pneumonia, old phthisis, and also the peculiar lesions of convalescents from Texas disease in liver, spleen, abomasum and rectum.

The second case examined was slaughtered in the dying state, and presented typical conditions in all the internal organs. Prof. Law, of Cornell University; Dr. Harris and Dr. E. H. Janes, of the Metropolitan Board of Health; the artist, Mr. Kohler, and many others were present.

Bullock No. 1. Killed at Bull's Head, September 26th, at 2:10 P. M.

Temperature of liver, eighteen minutes after death, 103½°; weight, 23½ pounds. Spleen very large, weighing 8 pounds 14 ounces, and its length 2 feet 6½ inches and 8 inches wide.

The duodenum inflamed and œdematous through its whole extent, and its mucous membrane soft—so soft that it was scraped off by lightly passing the nail over it.

The ductus communis choledicus, on opening, was found to be inflamed throughout, and having longitudinal bloody streaks like fresh ecchymoses of blood; at one point was found what seemed to be a little ulcer recently sloughed. One kidney weighed 2 pounds 13 ounces; the other, 2 pounds 14½ ounces.

These viscera were sketched, on the spot, by Mr. Kohler. The blood and bile were subjected to chemical analysis.

No. 2. Temperature of blood of aorta, at death, 105½°. Temperature of liver, fifteen minutes after death, 106°; the liver was but little above the normal size. The spleen weighed 2 pounds and three-quarters. The bile presented only slight characteristics of the disease. The conclusion was that this bullock was convalescent when attacked with pleuro-pneumonia. The disease in the chest was very extensive, and would necessarily have proved fatal in the course of a few days, owing to the great effusion in the pleuritic cavity.

September 27th. Visited Communipaw with Professor E. Law,

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Drs. E. Harris, E. H. Janes, and others, and witnessed the slaughter of several Texan cattle.

Dissections of ordinary Texas cattle, at Communipaw, September 27th, that presented an unhealthy appearance while living:

Bullock No. 1. Estimated gross weight of bullock, 1,500 pounds. Temperature of blood at slaughter, 100°. Abomasum: folds normal in appearance, presenting a few slight recent abrasions in the lower section of the folds, and a few old cicatrices. The pyloric portion, like the folds, normal in color, soft, marked extensively over the whole tubular section with cicatrices and old sloughs, most of them extending longitudinally upon the rugaæ. The length of the cicatrices varies from an inch and a half to a quarter of an inch, a few not yet covered with epithelium. The spleen normal. The rectum perfectly healthy.

No. 2. Spleen large, but natural in appearance.

No. 3. Spleen rather large, though healthy in appearance. The abomasum—color of mucous membrane normal.

No. 4. Spleen rather large, and darker than natural. Extensive old cicatrices of the abomasum, about one-sixth of the whole tubular portion marked with these cicatrices.

No. 5. The abomasum—the color of the mucous membrane over the folds rather darker than natural; mucous membrane soft, but untouched by any disease, so far as its present appearances are concerned. The tubular portion, covered over about one-fifth part of its surface with cicatrices; only a few of these have yet received an investment of epithelium.

No. 6. The abomasum: very similar to that of the others, with congestion of the folds, presenting cicatrices and a few sloughs near the pylorus, one of which had extended down to the muscular structure, much contracted in circumference, healing not yet completed.

No. 7. Shows no evidence of having suffered from the disease. The abomasum showing venous engorgement. Spleen smaller than in actual disease.

No. 8. Abomasum shows the common erosions with black surface. The pyloric portion exhibits the erosions, but somewhat more convalescent than the others.

No. 9. Temperature of blood at slaughter, 102°.

No. 10. Temperature of blood at slaughter 99°. The ductus communis choledochus was examined and found thickened. The abomasum contained some extensive erosions; some in the pylorus. The spleen was contracted in shape and very dark colored.

No. 11. Abomasum exhibits highly congested venous engorgement, with extensive old erosions; extensive cicatrices of the pyloric portion.

These eleven post mortems were made for the purpose of witnessing the condition of the viscera, etc., in a herd that had arrived by way of Abelene, Kansas, and which had been pastured for two months in Illinois without any discoverable signs of infection of

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disease, except that a few of the steers had a sickly and emaciated appearance.

September 28th. Inspected cattle at Bull's Head; released 69 head of Texans, belonging to Henry Livingston, in quarantine for two days.

October 6th. In examining cattle at Bull's Head, found a white ox in yard, belonging to S. B. Richardson. He came from near Lafayette, Indiana, in a drove of 174 head bought of Clafner, at Buffalo; 57 head came to New York, and 117 went to Bergen, New Jersey. When found, this ox lay groaning in distress; rectum protruding, very red; making constant and painful efforts to defacate, without being able to pass anything; restless, lying down and rising frequently, going to the trough for water every few minutes. Removed to hospital; temperature 104¾°. He was kept under observation; recorded the following temperature, Fahrenheit scale:

October	6th	104¾°
do	7th	104¾°
do	8th	104¾°
do	9th	104¾°
do	10th	103½°
do	11th	103 °

The owner supposing him to be suffering from constipation (he did not chew any cud during the six days), was allowed to treat him as he desired. Injections per rectum of various kinds were resorted to, but without relief. On the 11th October, showing evident signs of collapse, he was valued at $40, and slaughtered, in presence of Drs. S. Smith, E. Harris, E. H. Janes, F. J. Randall, and myself, together with Mr. Kohler, the artist, and many others.

The notes upon this case, taken at the time of slaughter, are as follows:

Respiration 26 per minute. Temperature of rectum, 103½°. Slaughtered at eight minutes past 11, A.M. Temperature of blood flowing from aorta, 101°; temperature of rectum, 100¾°; temperature of liver, 100°. Specific gravity of blood, 1.055.

For fifteen minutes after death, the blood from the aorta remained fluid; began to coagulate twenty minutes after flowing from the aorta. Spleen, 2 pounds 11¼ ounces. Liver, 18 pounds 4 ounces, divested of the bile and gall bladder. It appeared fatty throughout. (Subsequent examination proved that, like the liver of the bullock that was slaughtered on the 26th September, the morbid alteration consisted as much in a "waxy" degeneration, as in the fatty deposit.) Minute biliary vessels visible everywhere, the color resembling "*cafe au lait*" of an ochre hue.

This is one of the few chronically diseased cattle that, after ineffectual attempts

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at convalescence, became deeply jaundiced and anæmic. The spleen, the liver, the blood, the bile and the fatty and cellular tissues bear unmistakable marks of the disease. Dr. Harris had the artist sketch the morbid appearances. (See plate 23 in General Report.)

This was a typical case of the Texas disease, and revealed a large mass of cellular tissue around the rectum, and in which the kidneys were imbedded, which upon microscopic examination revealed an abundance of hæmatoidine crystals.

October 17th. Three steers found sick; two of Bright and Fagan's, and one of Williams and Richardson's; removed to hospital.

TEMPERATURE RECORDS as follows:

DATE.	LOP HORN.—B. & F.			SPOTTED.—B. & F.			CRUMPLE HORN. W. & R.		
Oct.	A. M.	M.	P. M.	A. M.	M.	P. M.	A. M.	M.	P. M.
17th	101½°	101 °	100 °	101½°	101 °	102°	104½°	103½°	102 °
18th	100¾	101	100	101	101½	101	104½	103½	102
19th	100	100½	100½	101	101½	102	104	103½	103½
20th	100	released.	.....	100	101½	.....	103	100½	released.
21st	.....	.....	.....	100	101	99	.....	.....	.....
22d	.....	.....	.....	100	101	100	.....	.....	.....
23d	.....	.....	.....	100	99½	98	.....	.....	.....
24th	.....	.....	.....	99	100	released.	.....	.....	.....

On the morning of October 17th, a fine fat bullock was abandoned near the National drove yards, and was carried to the rendering dock, and slaughtered during the afternoon. The animal was slaughtered when in a moribund condition. Temperature of rectum, blood, and of the liver was one hundred and one and a half degrees; weight of liver, twenty-four pounds; gall bladder filled with thick flaky bile; weight of spleen, five and three-quarter pounds, disorganized; bladder filled with bloody urine; rectum contained a thick, black fluid, resembling black vomit; the fourth stomach was eroded and ulcerated; the kidneys were engorged to seventy-five per cent more than their natural size, and were beginning to be disorganized; lungs were healthy; no coagulated blood was found in the heart or great vessels.

From October 17th to 22d, daily inspections of all cattle arriving were continued; no new cases found. 22d. Commissioner Gould having learned some facts with reference to a dairy herd that had become infected at Hamptonburgh, Orange county, desired me to go with him and prosecute an investigation into the circumstances.*

* Dr. Montfort, the health officer of Newburgh, who had been vigilantly watching the movement of suspected cattle arriving at that city from Albany, unexpectedly discovered

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We, therefore, proceeded to Newburgh, and were joined by Dr. R. V. K. Montfort, the Assistant Commissioner for Orange county. We then visited Goshen, and from thence went to Hamptonburgh, where the following facts were elicited:

On the 25th day of August, there arrived at Hamptonburgh, Orange county, N. Y., forty-four head of native cows and heifers directly from Painesville, Lake county, Ohio, on the line of the Lake Shore road, over which Texas cattle frequently travel. They were purchased in Buffalo for a Mr. Hodge, a cattle dealer at Goshen, Orange county, N. Y. On the morning of arrival one of the cows was observed to be unwell, and died in a few hours. The symptoms observed were as follows: "The head hanging low down, gait staggering; appeared very weak, and finally fell down, death supervening soon afterward." August 29th (four days after), two cows were purchased of the same lot by Wm. Moul, apparently well. They were driven about six miles, and were turned into the pasture among the dairy cows of Mr. John Moul. Here they remained from Saturday, the evening of the 29th, until Tuesday morning, the 1st of September (three nights and two days), when they were removed some miles distant. September 8th, one of these cows died. The other was then taken back to Hamptonburgh, the place of purchase, as under suspicion, and on the 10th of Sep-

that the Texas cattle disease had made its appearance on the southwestern margin of that county, near Hamptonburgh. The following is his first account of that outbreak:

"NEWBURGH, *September 17th*, 1868.

"T. HARRIS, M. D., *Metropolitan Board of Health:*

"DEAR DOCTOR—Two car-loads of cattle (forty in number), said to be from Ohio, were purchased at Montgomery, in this county, on the 28th day of August, and were driven some five or six miles, to Hamptonburgh, the same morning, arriving about 9 or 10 o'clock. Soon after, one of the finest cows in the herd was taken sick, and died before night. Two of the herd were bought by William Moul, a neighboring farmer, and were left three or four days upon the farm of John Moul, grazing with his dairy cows. They were then removed. Ten days after their purchase, one of these cows sickened, and died in a few hours. Three days later, the second cow also sickened and died in a few hours. Saturday, September 12th, one of the cows of John Moul was taken sick. She died on Sunday, Monday night another cow of John Moul sickened, and died Tuesday afternoon. Both of these had grazed with the two left for a few days by William Moul. The remainder of John Moul's cattle are still healthy. Fifteen bullocks, out of two car-loads, are yet in the neighborhood—all well. Two were purchased by a Mr. Carroll; one is well, the other sick; appears very weak, pants heavily on the least exertion, gives milk, but in small quantities; feeds poorly; had a calf two weeks ago. The owner says she never *cleared*, and ascribes her illness to that cause. Eleven of the same load were sold to a farmer near Montgomery, and when last heard from were all well. I know nothing of the balance (9). Hamptonburgh is an old cattle stand, where a large part of the farmers of that portion of Orange county purchase their stock.

Yours, truly,

(Signed) "R. V. K. MONTFORT."

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tember also died. The symptoms of disease of this cow were recognized as the same as those that had been seen among cattle at Buffalo that had died with the "Texas fever," and were as follows: "Drooping of head and ears; staggering gait; eyes dull and staring; great debility; rough coat, and generally such appearances as are not observed in the ordinary diseases of cattle" with which they had been familiar for years. Upon tracing what had happened from the exposure of the dairy cows upon John Moul's farm, where these two cows had been pastured for a short time, we found that upon the 12th of September (thirteen days after exposure), one of the milch cows was found to be ailing. Her milk had been falling off in quantity for three or four days; she appeared uneasy, frequently lying down; very thirsty; would not feed; head drooping near the ground; standing braced with the hind legs; coat rough, dung natural, urine not noticed; no cough, and on the night of the 13th died. On the 14th (fifteen days after exposure), another cow was observed to be sick, presenting symptoms the same as the former, with the addition that she seemed indifferent to passing objects, remaining alone by herself, and passed bloody discharges from the bowels, and dark, bloody urine; milk entirely suppressed, although she gave the usual quantity the night before. She had been suffering with hoof distemper three weeks previously, but had entirely recovered from it. She died on the 15th (the following day). The 18th of September (nineteen days after exposure), the third cow was sick, and during that day was found dead in the pasture. Her milk had been diminishing in quantity three or four days previous to death, and she had presented much the same symptoms as those previously affected. These cows unfortunately were not examined after death, but were deeply buried.

The two cows that had died of the original herd were not buried sufficiently deep, as during the process of decomposition after death, the thin covering of earth was thrown off, leaving the carcass of one of them exposed. Two pairs of oxen and two young heifers were allowed to pasture in this field where the dead cows were buried, and one of the pairs of oxen was used in hauling the dead cow. About two weeks after, one of the oxen was found to be sick, and presented the same symptoms before described, from which, however, he finally recovered. Another ox belonging to the second pair was found dead, on the 21st of September, in the field, being twenty-eight days from the burial of the first cow.

October 24th. The two heifers, one a yearling, the other two

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years old, which had been pasturing in the same field where lay the dead cows, and where the oxen were sick also, were found dead. They had not been discovered to be suffering with any illness. A post mortem examination of these revealed the livers enlarged; spleens enlarged more than twice their natural size, engorged with blood, in a state of decomposition; kidneys engorged with blood, softened almost to decomposition; bladders containing a very small quantity of urine of a healthy consistence. All the other organs were found in a healthy condition, except the abomasums, or fourth stomachs, which presented several superficial ulcers upon the thick or pyloric extremity, as well as some lines of ulceration among the folds of the thinner portions. The carcases, after examination, were thoroughly burned up.

From these investigations, which were carefully and thoroughly made by the State Commissioner, J. Stanton Gould, and Assistant State Commissioner, Drs. R. V. K. Montfort and Moreau Morris, there can be no doubt that the drove originally from Painesville, Ohio, had been infected with the malignant poison, either before starting or during their journey, and that they had communicated the disease to the dairy cows and oxen at Hamptonburgh. These dairy cows had not been off from the farm of Mr. John Moul for the past two years, and had not been exposed to any strange cattle at any other time. The oxen had been in the town and county for several years, and had not been exposed in any other manner. That these cattle had the "Texas fever," all the testimony of persons who had observed them, and by one who was familiar with the symptoms, having frequently seen cattle suffering with the disease at Buffalo, must convince any candid mind. The remarks of several persons (old dealers in cattle) that these sick ones did not appear to have any disease with which they had been familiar, afforded another proof, that this was an importation of some new and malignant disease among them. Two more milch cows died, one on the 26th and the other on the 28th October.

The subjoined letter from Dr. Montfort, gives the history of these cases:

NEWBURGH, *November* 9, 1868.

MOREAU MORRIS, M. D.:

DEAR DOCTOR—We have had two new cases of Texas fever since I saw you. The first case after you were here occurred on Monday, the 26th of October. She was observed to be sick on Monday, with the usual premonitory symptoms, although they were so slight as readily to escape the observation of a casual observer. She gave a fair quantity of milk at night. She died about 7½ A. M.,

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Tuesday. A post mortem made about eight hours after death gave the following results: Flesh very dark; fat of reddish yellow color; lungs perfectly healthy; heart healthy; spleen enlarged to three times its natural size, engorged with blood and disorganized; liver slightly enlarged and fatty; gall bladder very full, contents but little changed; kidneys natural; fourth stomach reddened and inflamed, particularly at pyloric extremity, with ulcers; mucous coat softened, peeling off readily; bladder entirely empty and contracted, feeling almost like a ball; rectum very much inflamed; mucous membrane softened. The period of incubation could not have been less than thirty-five days. Another cow died on Wednesday night, October 28th. She was first seen to be sick in the morning. Nothing particular was observed, excepting the arching of the back, and great restlessness. No post mortem.

Yours truly,

(Signed) R. V. K. MONTFORT.

REMARKS UPON THE CASES IN ORANGE COUNTY.

This remarkable group of cases in Orange county justly awakened a profound interest, and induced the most searching inquiries connected with the history and exposure of the herd in which these deaths occurred. The exceptional characteristics presented by the sickness in those herds, called for the most exact diagnosis of the nature of the disease. First—Cattle that were supposed to be natives of the Western States, and that had arrived from Painesville, Ohio, in the ordinary course of traffic and transportation, began to show symptoms of disease within a week from the time of their shipment from Painesville, Ohio. The true Texas cattle disease, as has been shown in Dr. Harris' correspondence, was at the time prevailing in Summit county, Ohio. That these cattle, which were at least reputed to be native stock, and communicated the disease to the healthy herds of the district with which they were pastured in common, did communicate the same kind of fatal disease that killed several of their own number, does not admit of the shadow of a doubt. In the absence of those exact methods of investigation which the medical anatomists pursued in our cities, we do not hesitate to take the straightforward testimony of experienced herdmen who saw the disease and described it to us.

In the two post mortem examinations which Health Officer Dr. Montfort and I made at Hamptonburgh, in the month of October, we were able to recognize the disease by the usual post mortem evidences, and better still, by the particularity and completeness with which the entire history of events and symptoms of these cattle were related to us. Here was the history of eight fatal cases of the Texas cattle disease in three different herds, in which no ground of doubt existed, that exposure to the Western cattle con-

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stituted the starting point and source of the disease; and viewing these eight cases purely upon medical evidence alone, we might safely conclude, reasoning by exclusion, that the Western cattle brought the disease into these herds.

The points we would notice specially in these cases occurring in Orange county are:

1st. The evidence concerning the period of incubation, gives an interval from fourteen to twenty-eight days.

2d. From careless and imperfect burial of dead diseased cows, the infection was communicated to other healthy native stock; and

3d. That the evidence of the contagion of the Texas cattle disease being communicated from native to other native cattle in this group, is beyond a doubt.

THE INVESTIGATION INTO THE HYGIENIC CONDITION OF BEEF CATTLE OFFERED TO THE METROPOLITAN MARKETS, AS FOUND IN THE SLAUGHTER HOUSES AT A PARTICULAR TIME.

Numerous facts having come to the knowledge of the Board of Health, concerning diseased meat being offered for sale in the public markets, a simultaneous inspection at a large number of slaughter houses during the slaughter of cattle, for a limited period, was deemed necessary.

On the 15th day of September, the following order was issued to eleven sanitary and assistant sanitary inspectors of the Board:

[*Copy.*]

METROPOLITAN BOARD OF HEALTH,
NEW YORK, *September* 15, 1868.

To DR. MORBAU MORRIS, *Sanitary Inspector M. B. H.:*

SIR—I have called upon the acting Superintendent of the Metropolitan Board of Health, Dr. Horatio Paine, to call together a force of inspectors, twelve in number, viz: Strang, Howard, Wadsworth, Demainville, Randall, W. V. White, Lee, Janes, Thayer, Fisk and Colton, and Deputy Registrar Stiles, to meet at this office at 11 o'clock to-morrow, September 16th, for special duty of inspection, subject to your special direction, upon the matter of diseased cattle and diseased meat in our midst. You will proceed with this inspection at once, and report.

Yours very respectfully,

(Signed) GEO. B. LINCOLN,
President Metropolitan Board of Health

The following named gentlemen were thus detailed: Inspectors Drs. Janes and Lee, of New York; Dr. Fisk, Thayer and Colton, of Brooklyn; assistant-inspectors Drs. Howard, Strang, White, Wadsworth, Demainville and Randall, of New York; and were directed under specific instructions and uniform methods, to make

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examinations at the different butcheries in their respective districts. All proceeded at once to the dock of the New York Rendering Company, foot of Thirty-eighth street, North river, where an animal sick with the Texas cattle disease was slaughtered in their presence, and carefully dissected. Illustrations of the specific lesions of the disease, which had been made from previous dissections of slaughtered animals, were also exhibited to them, with explanations, so that their examinations could be made understandingly.

The investigation was continued for three days consecutively, with the following results:

Two hundred and ninety cattle were slaughtered in their presence and of these, two hundred and thirty-six presented evidences of diseased conditions. The viscera of many others which had been slaughtered upon the same days, but at whose slaughter they were not present, were also examined carefully, and found to present evidences of the same conditions. With two exceptions, all reported finding abundant evidences of different conditions of gastric disease, while but two were able to identify the lesions found as belonging to the Texas cattle disease. (See plate 3.) These were observed by Dr. E. H. Janes and B. Howard, in a lot of ninety-four Texan cattle that had recently arrived from the West, and were among those that had introduced the disease among native cattle in Illinois, and had not been wintered during one season at the North. Dr. Janes reports: "From the foregoing facts, a thorough examination of their internal organs became a subject of more than ordinary interest. The abomasums, without exception, revealed evidences of having been extensively diseased, as shown by numerous cicatrices and erosions in the process of healing, as well as a general hyperæmic condition of the mucous membrane, showing that the animal was suffering, to a greater or less extent, with chronic gastritis at the time of slaughter. The spleens were invariably enlarged to at least twice the size of those from healthy Northern stock, as was found by testing the weight of each. Photographic views illustrating the comparative size of the spleens of the Texan with that of the Northern stock, have been prepared." (See wood cuts in general report.)

Dr. Howard being present also at the slaughter of a portion of this herd, remarks that "the lesions observed in these Texas cattle were the same as those we had found in those of our native herds affected with this disease, and that as nearly as possible the disease in each case is identically the same." Having been present myself

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during the slaughtering of a portion of this herd, I can fully corroborate the truth of the foregoing statement.

As a result of these investigations, the following conclusions are unavoidable:

That our Metropolitan markets are supplied with large quantities of unwholesome beef, the cause of which is wholly preventable.

That cupidity and self-interest, among a large class of dealers, will regard neither health nor life in the pursuit of gain; consequently it is the imperative duty of legislators and health authorities to authorize such sanitary regulations and restrictions as shall at all times guard and protect the public health.

Skilled inspection, and regulation in the transportation of our animal food supply from the great producing sources to the final slaughter, with proper authority to compel compliance, would be, and is, the only safeguard necessary to secure a healthful animal food. Our State and the Metropolitan district being the great consumers, must place such restrictions as will secure this end.

OBSERVATIONS UPON POST MORTEM EXAMINATIONS OF DISEASED TEXAS CATTLE SLAUGHTERED AT BUFFALO, N. Y., LAFAYETTE, IND., AND SPRINGFIELD, ILL., AT WHICH WERE PRESENT COMMISSIONERS PATRICK AND GOULD, AND ASSISTANT COMMISSIONERS MACKAY AND MORRIS.

At Buffalo, on the 24th November, 1868, we found in the cattle yards of the New York Central railroad two Texan steers; arrived on the 23d inst. directly from Abelene, Kansas; owned by George Toffey; sick with the Texan cattle disease, and evidently in its last stages, presenting the following obvious symptoms:

No. 1. A dun-colored, four year old steer, standing with head low down; saliva running from the mouth; ears drooping; eyes staring, glassy and dull; coat rough; arched spine; hind feet drawn under the body; voiding bloody urine; fæces fluid and dark; gait staggering; subsultus tendinum of portion of flank muscles; great debility; unable to walk any distance without falling down; rising with great difficulty; temperature of rectum, 105½° Fah.

Pathological Appearances at Slaughter, 1 P. M., Same Day.

Temperature of blood flowing from carotids, 106¼° Fah.

Liver enlarged, much congested, fatty degeneration, and weight 17 pounds 8 ounces.

Spleen enlarged; engorged with dark blood; a pulpy mass; size, 2 feet 5 inches long, 6¼ inches wide, and at the thickest part 3½ inches through; weight, 5 pounds 13 ounces.

Omasum or manifold stomach, the maniples impacted with firm, dried, partially digested food, resembling gun wads in form. The epithelial coat peeled off whenever the food was removed, and was easily detached by the finger.

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Abomasum (4th or rennet stomach) presented deep excavated ulcers through to the muscular coat, particularly in the pyloric portion. The larger folds of this stomach very slightly inflamed, and having small longitudinal ulcerations along the margins of the folds, filled with coagulated blood.

Bladder distended, with about a quart of dark, bloody-colored urine. The mucous coat of its neck very œdematous; that of the fundus thickened and covered with fine red puncta.

Kidneys enlarged, much congested with blood; mottled, of a very dark brownish color; softened.

Rectum; longitudinal folds highly injected and inflamed; eight in number.

Cœcum deeply injected at its extremity.

Ileum; large red points arranged in longitudinal lines; epithelial coat softened and easily removed by the nail.

Brain somewhat softened in its cortical substance.

Bile thick, tarry, somewhat flaky, though less so than in many cases previously observed.

No. 2. Was of a dun brown color; Texan; aged about five years.

External or Obvious Symptoms.

Head hanging down; ears drooping; eyes dull; conjunctiva jaundiced; listless; gait staggering, feeble; flanks very much tucked in; urine clear; fæces thin, dark fluid; pulse 120 per minute, soft and easily compressed; temperature 104½° Fah. Slaughtered at 2 P. M. same day: temperature of blood, 105½°; temperature of liver, 15 minutes after death, 104½°—fatty, larger size than average normal—not weighed.

Spleen enlarged and engorged with dark blood; pulpy mass; weighed 3 pounds 15 ounces.

Brain: superficial vessels much congested; cortical tissue softened.

Bladder: small quantity of urine of healthy appearance.

Abomasum, or fourth stomach, presented over its pyloric surface several cicatrices in different stages of reparation, and one large, deep-excavated ulcer with edges everted; size of ulcer, 2 inches long, 1 inch wide, and ½ inch deep, surrounded with dense, hardened tissue; some marks of gastritis, consisting of erosions of the thin mucous coat of the large folds along their free margins.

Omasum, or maniply stomach, appeared healthy. The intestines appeared in a healthy, normal condition, except rectum, which was somewhat congested.

Kidneys normal.

Specimens of the blood, bile and tissues of the animals were secured, and a portion of each forwarded to Dr. Stiles, of Brooklyn, for microscopical examination. He reported, a few days after, that these specimens presented indubitable evidences of the Texas cattle disease. The same evidences were observed by an examination under the microscope of Prof. Hadley, of the Buffalo Medical College, upon the day of slaughter.

At Lafayette, on the 27th November, we examined the stomachs and other viscera of over twenty Texas animals of a herd of eleven hundred that had not been wintered over, but arrived in Indiana

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early in spring. These animals were said to have communicated the disease to various other herds of native stock during the past summer, and two hundred and forty of them were now being slaughtered for packing at the establishment of Sample & Sons, at Lafayette, Indiana.

The stomachs, livers and spleens afforded in every instance examined, evidences of former disease.

At Springfield, on December 1st, two healthy animals were examined at slaughter, one a Texas steer, the other a native heifer. The Texas steer presented cicatrices of former ulcerations in the pyloric portion of the fourth stomach, although all other internal organs were perfectly healthy, while the fourth stomach and all other viscera of the heifer were in a sound and healthy condition.

EVILS THAT HAVE BEEN RESTRAINED AND CONTROLLED, AND SANITARY MEASURES CONCERNING CATTLE AND BEEF IN THE CITIES OF NEW YORK AND BROOKLYN.

Observation has revealed the fact that large quantities of unwholesome beef and other meats are constantly thrown upon the supply markets for consumption, so prepared and disguised that detection is almost impossible. Unscrupulous dealers, having no fear of authority to control them, unhesitatingly sell whatever can be obtained, regardless of life and health The laboring classes, those who really need the most wholesome and nutritious of meats, are, therefore, the greatest sufferers, for, by reason of low prices, they are induced to purchase inferior qualities. Hence the imperative necessity for sanitary regulations and control, that all danger of diseased and unwholesome meat consumption must and shall be avoided.

The results of the control and regulation of meat supply as carried out during the past few months, are that a better quality, at reduced prices, were secured. Thus protecting the lives and health of all, and establishing the necessity for a continued and systematic inspection, not only at the great sale yards, but also at the butcheries.

The alarm of the public by rumors of diseased meat being offered in the markets, and the fact of being unable to discriminate between wholesome and unhealthy meats, caused the consumption and sale of beef to be very largely diminished. Supplies of market cattle at the herd yards were seriously threatened, until the prompt and efficient measures adopted by the Board of Health

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and State Commissioners in the sanitary control and inspection of all herds arriving at our herd yards re-assured the public, and at once established confidence, both in its sale and consumption. The danger to life and health by its consumption was great, and, on the other hand, the deprivation of good animal food, was not without evil, therefore, to secure both, was a paramount duty of the Board. The sanitary regulations established by the control. inspection, seizure and destruction of diseased animals and beef was, therefore, at once determined upon and effected; all beef cattle arriving within the Metropolitan district were subjected to a critical inspection as regards their physical condition; if any were found either sick or under suspicion of being infected with disease, they were at once seized, and either slaughtered and sent to the rendering tanks, or held under observation until all danger from diseased conditions had passed. These regulations secured effectually the public health, and prevented, in a very large degree, the forwarding of diseased animals to the herd yards. The supply became of a better quality and at lower rates. Increased watchfulness on the part of the sanitary police at the slaughter houses and retail stands, prevented the sale not only of unhealthy beef, but also of large quantities of other unwholesome meats.

WHAT IS DESIGNED AND WHAT SHOULD BE ACCOMPLISHED BY SANITARY INSPECTION AND CONTROL, AS REGARDS ANIMALS AND MEAT IN THE CITIES OF THE METROPOLITAN DISTRICT.

When cattle dying of this new disease were found in the herd trains and market yards that supply the metropolis, the fact at once was painfully obvious that no regulations or officers then existing could discover and prevent the sale of any or all of the flesh of those dying and dead animals in the meat markets of New York and Brooklyn.

(1.) A regards the sales' yards and butcheries, there existed no system of inspection and no means of control with reference to the prevention of the selling and slaughtering of diseased animals.

(2.) There was a lack of any adequate means for officially inspecting and sanctioning meats after they are dressed for the market.

(3.) Except in connection with the statutes against rinderpest, there was nothing worth the name against any kind of exposure of diseased animals, and against all sorts of cruelties and abuses in their transportation, yarding and sanitary care.

Expert and careful inspection at herd and sale yards, of all

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animals used for human food, is absolutely required at all times, as some form of disease exists at every season of the year in the various kinds of animals so used. Authorized sanitary control and regulation should be permanently established, and carefully and efficiently executed, not only as regards the herd yards and butcheries, but State authority, with power to enforce regulations, should control and so regulate the transportation of animals as to present them to the markets in the most healthy condition.

WHAT CONCLUSIONS AND RESULTS HAVE BEEN REACHED.

The conclusions deduced from the experience of the past summer indicate the necessity for

First. Regulation and police control under a uniform law, applicable to all the States through which pass the great transportation routes for market cattle, in order that the first evidences of any contagious disease may be arrested.

Second. Such control to have sufficient State authority to compel transporting agents, owners or their aids, to take proper care of their stock in regard to rest, feeding and watering at stated regular intervals of time during transportation, and up to the time of slaughter.

Third. Skilled medical inspection at stated points; all diseased animals to be at once slaughtered or held under observation until all danger has passed. This inspection to be continued during the whole year.

Fourth. All animals at the slaughter houses to be critically examined at the time of slaughter, and the beef to be so marked that any consumer may be assured of its having been properly inspected.

Fifth. Such authority to be given that all diseased meat may be seized and disposed of in such manner as to prevent its being eaten. The results of such control and inspection will be the public assurance that danger to health and life from this source will be reduced to the least possible degree, that fraud and deceit will be under control, and that the aim and efforts of enlightened sanitary laws shall be supported and enforced.

CONCERNING SYMPTOMS AND SIGNS OF THE DISEASE.

DIAGNOSIS.

In studying the history of this disease, the following points present themselves by which professional and non-professional observers can be guided in pronouncing the diagnosis:

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1st. The symptoms by which the disease is characterized in the infected cattle while living; and

2d. The signs by which it is recognized in them when dead, or at their slaughter.

1st. Animals suffering with this disease present the following obvious symptoms. (See plate No. 1.)* Generally standing apart from their fellows, listless, indifferent to surrounding objects, restless, evidently desiring to lay down but fearing to do so, until compelled to yield by rapidly waning strength; the head hanging low down, frequently within an inch of the ground, or occasionally pressed firmly against some unyielding object; the base of horns hot, the ears drooping, the eyes dull and staring; the spine, or back, peculiarly arched, the hinder feet being drawn under the body and placed in a bracing attitude; a tremulous creeping over the flank muscles, with frequent efforts at voiding fæces, which are generally small, hard and rounded, and covered with bloody mucous, though there is sometimes considerable looseness of the bowels, during some stages of the disease; frequently passing urine of a dark, bloody appearance. The pulse is rapid, very soft and feeble, respirations frequent, and during hot weather, panting, without exertion. The temperature both externally and internally increased. Flies are also observed to adhere to the animals who seem either unconscious of their presence or too feeble to drive them off.

2d. The signs or pathological appearances presented upon post mortem examinations.

When dead animals of this disease are examined, even three or four hours after death has naturally taken place, it is found that there has been such rapid decomposition that the special pathognomonic signs have become almost entirely obliterated, so rapidly does the peculiar activity of this poison destroy vital tissues. It is only in the previous history of symptoms in connection with certain marks of destruction upon the dense, firm membrane lining the tubular and pyloric portion of the abomasum, or fourth stomach or "reed," as it is called in common parlance, that a positive diagnosis can be given.

But the signs as presented upon an examination at slaughter are so uncomplicated with post mortem changes, that the disease is pronounced unequivocally throughout the fluids and tissues.

* Dr. Harris has kindly directed that the lithographed plates which he caused to be prepared for the general Report, shall be distributed in the several sections which require illustration.

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1. A greatly increased temperature of the body and the blood is an indubitable and most trustworthy symptom of this disease, for it is the first symptom discoverable; it is excessive and extraordinary in degree, and it marks this disease as a pestilential fever.

2. Upon opening the animal the muscular tissue is seen of a dark red color; the fat is of a deep brown yellow, having in intense cases a green bronzed tinge. (See plate No. 2.)

3. The spleen is found enlarged, more or less engorged with dark colored blood, softened, frequently to a pulpy mass.

4. The abomasum, or fourth stomach, upon its inner tubular pyloric portion invariably presents sloughs, erosions and deep excavated ulcers of various forms and extent. (See plate .) There is usually accompanying these, more or less inflammatory appearances of the larger and more vascular portion of this stomach (gastritis). The ulcerations, or rather the peculiarities, that were found in the tubular portion of the rennet or fourth stomach, and at the base of the longitudinal folds in that stomach, finally appeared to be a surer guide to a recognition of the disease than was the mere appearance and size of the spleen or the liver; the absolute tests by the minute examination of the liver, bile and spleen-pulp by the microscopist, and the historical and symptomatic history of the animal before death, being of course preferred to all other kinds of evidence. Yet to the practiced eye, these ulcerations, sloughs and erosions served as trustworthy guides in deciding the nature of any case in which, for the moment, the other kinds of evidence were not accessible.

5. Kidneys generally enlarged, darker in color than normal, congested with blood, and the cortical substance usually softened.

6. The liver enlarged, increased in weight, generally fatty or waxy, its bile ducts and radicals fully injected with bile, its color changed to a yellowish brown.

7. The gall bladder filled with a dark, thick, tarry or flaky bile.

8. The bladder distended with dark, bloody urine.

9. The intestinal canal in its various portions, the ileum cœcum, and rectum, frequently presenting congested vessels under its mucous coat, its epithelium softened and easily scraped off with the finger.

10. The heart: muscular tissue sometimes found softened.

11. The lungs generally in a healthy condition; in some intense cases, interlobular emphysema.

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12. The brain, in some cases, congested and softened.

In pronouncing the diagnosis of this disease beyond all dispute, the revelations of the microscope places the final seal upon all this group of symptoms and pathological changes.

The blood, and bile, and liver, under this (microscopic) test, give us a view of that factor which is the poison, which has produced these changes and death.

MOREAU MORRIS, M. D.

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III. OBJECTS ATTAINED BY CORRESPONDENCE WITH OTHER OBSERVERS OF THE DISEASE.

The correspondence upon this subject was opened on the 10th of August, and upwards of one hundred letters of inquiry during the ensuing two weeks were dispatched to those gentlemen along the great routes of cattle transportation, from Kansas City and Cairo to Toledo, Pittsburg, Buffalo and Providence. From that period to December 1st the correspondence has been maintained to such an extent as seemed essential to the end in view.

We sought for precise and circumstantial records concerning the arrival of cattle at any period sick and dying with the disease; secondly, circumstantial accounts of each outbreak of its infection in native herds; thirdly, dates which would establish in each case the length of the period of incubation of the infection in herds which became its victim; fourthly, descriptions of the phenomena and the results of the disease; fifthly, to trace the disease back to sources whence it came.

As neither the limits nor the objects of this report permit the introduction of our correspondence in bulk, we will here present such extracts from it as seem best adapted to throw light upon the history and progress of the infection.

Under date of August 10th, Dr. Edwin M. Snow, the Superintendent of Health in Providence, Rhode Island, communicated the following facts:

On Tuesday last (August 4th) thirty-three head of Illinois cattle were purchased in Albany by Messrs. Moore & Perkins, of this city. These steers were sent by railroad, and arrived at Providence at three P. M. on Wednesday, the 5th. They were driven to a pasture, and were supposed to be entirely well. On Friday, one of the animals was found to be sick and was killed, and on Saturday and Sunday (August 8th and 9th) six died in the pasture. All the animals that have died have been boiled up for their fat. All these cattle were raised in the State of Illinois. There were no Texas cattle in this lot.

Two days subsequently (August 13th), Dr. Snow writes:

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The owners have voluntarily given them into my control, to do what I please with them. Eight of the ten now living were very low with the disease, but an astonishingly rapid change has taken place, and it now looks as if they would recover.

Under date of August 14th, Dr. J. H. Rauch, the Sanitary Superintendent of Chicago, began to forward to us daily accounts of the progress of the disease at the herd yards of that city. On the 17th of August he wrote as follows:

We have had the disease in our Fifth ward since August 1st, and for the last two weeks Dr. Manheimer, one of the Sanitary inspectors, has been making observations upon it. * * * I have disinfected the yards where the Texas cattle have been. In Dr. Manheimer's inspection district (Fifth ward) sixty-two cows have died, and I have learned of several new cases this morning.

On the 16th of August, Dr. J. T. Hodgen, President of the Board of Health, in St. Louis, wrote as follows:

* * * The day before your letter was received, our Health Officer called the attention of the Board to the fact that a very malignant disease was prevailing amongst native cattle brought to our city. The disease has manifested itself at but one stock yard, and that at which most Texas and Cherokee cattle have been received, and in pens in which these southern cattle had been kept.

Yesterday a post mortem was made of one that had died of the Texas disease. The Health Officer found the liver engorged, also lungs; the spleen enlarged and softened, and the kidneys disorganized masses, not showing a trace of original structure. The symptom was an uneasiness for a few days; this increased to almost a fury, the animal moving rapidly for a short distance and then standing, then a tremor and marked debility; it finally fell, and in a few hours expired.

Other examinations are being made to-day, and will be continued until we are satisfied of the pathology of the disease.

We have ordered the use of carbolic acid in pens in which Texas and Cherokee cattle have been kept, and have appointed inspectors of all cattle. We shall allow none to be killed without the inspector's brand and certificate.

Under date of August 19th, Dr. E. E. Mackey, the Health Officer of Buffalo, wrote:

MY DEAR DOCTOR—I fully concur with you in the expression of your fears that the many important and much desired facts pertaining to the cattle plague now raging, will never be studied out to our satisfaction and enlightenment.

* * * * * * * * *

On the 10th of August, there were received at our yards, fifty head of Illinois cattle, thirteen of which showed unmistakable symptoms of infection, and these symptoms were striking and peculiar in their nature. The animals appear to be very dejected, head drooping, eyes watery and wild in their expression, pulse very frequent and full, respiration increased in frequency, and the breathing labored. The secretions from the mouth and nose in three of the cases, were of green, frothy or slimy appearance. The unsteady gait of the animals is mostly confined

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to the hind extremities arising from what appears to me paralysis, or partial paralysis of the muscles and a deficiency in the power of co-ordination; indeed, so marked was this symptom in three cases as to preclude the possibility of the animal's rising. The temperature increased, and emaciation very marked. I can not say how long they would have lived, as I deemed it safer to have them immediately slaughtered. Post mortem examinations showed the respiratory organs and the heart to be healthy, no structural change having taken place. The gastro-intestinal canal very much inflamed, and found to be in many places softened. The liver normal, the spleen very much enlarged, softer and more easily broken down than in health. * * * * * * * *

The urine coagulated on the addition of nitric acid, or on the application of heat. It may be of interest for you to know that so far the disease, as it has made its appearance here, has been confined to Illinois cattle, *not one* Texan animal, out of the large number that has been received here, has shown any discoverable or obvious symptoms of infection. In answer to your several points, I will say, first, that all my endeavors to obtain any reliable information beyond the mere fact of these cattle being of an Illinois stock, have proved fruitless, and I am, therefore, without any data by which to judge; second, of the cattle in quarantine, four showed obvious symptoms of being diseased two days after their arrival, and on the third day showed unmistakable signs of the presence of hæmaturia; three others that have since been attacked with the disease were immediately killed, and no observation was made upon the state of the urine and the bladder; third, out of the seven head killed while in quarantine, four were discovered to be infected two days, and the other three, four days previous to any obvious symptoms showing themselves; fourth, two dogs were fed upon the diseased flesh, and no other effect noticed than the ejectment of the same shortly afterwards; in neither case would their stomachs retain or digest it. I am of the opinion from the testimony I have been able to collect, and the little experience I have had with this infection, that there would be much danger incurred from eating the flesh and drinking the milk from these animals. It seems very improbable to me that so much gastro-intestinal disease as I have seen in all these cases can be due to any other cause than the presence of some violent irritant. I will communicate further on this subject.

Respectfully,

E. E. MACKEY.

Dr. Rauch, the Sanitary Superintendent of Chicago, wrote on the 19th of August, a full account of the proceedures that were being taken by the Board of Health in that city. He inclosed the following account of Dr. Manheimer's investigations in the "infected district" (Fifth ward):

The increased mortality among the cows is found in a limited district of from two or three miles square, well defined on the south by Egan avenue and the stock yards; north, by Archer avenue; east, by Wallace street; and west-south, by the south branch of the Chicago river. Outside of these limits until this time no sickness or deaths have occurred. The region, then, where the disease makes its appearance, is the immediate vicinity of the cattle yards.

The first cases were noticed on Deering street, near Egan avenue, and from thence it extended, in a short time, to the above described limits; the largest number having died on Egan avenue, Douglas place, Main street and Hamburg,

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near the cattle yard, so, that from the 2d to the 15th of August, sixty-three cows and one steer died. The cause of the sudden spread of the disease is, so far, not yet satisfactorily explained by the investigations made.

It seems that native cattle do not communicate the disease to each other; as in many instances cows were housed in the same stable with sick cows, without being infected. With but few exceptions, all those cows became infected and died, that grazed near the cattle yards and in localities formerly occupied by Texan cattle, drinking of the same water used by the latter, and which may have become impregnated by their urine and excrements. (This water runs from the cattle yards to Egan avenue.) In a circuit of about two miles, only one cow escaped the disease, and that one was kept in the stable for the last three weeks.

All taken together, tends to prove that the origin of the disease, or the cause of the same, is to be found in the Texan cattle that had been in the cattle yards and grazed in their immediate vicinity.

The symptoms of this disease, in the outset, are varied, as many of the cattle, from the beginning of the attack to the time of death, are quiet and in a lethargic state, evincing no signs of pain; while others are very uneasy, constantly moving about and lowing, until they drop down exhausted, where they remain until dead.

The following symptoms are noticed in all cases that have fallen under my observation:

In the beginning of the disease there is an uncertainty of step, and trembling, showing an inability to remain firmly standing on the feet, and with a disinclination to move; the head drooping. The appetite does not seem to be impaired, nor is there any unusual thirst; the skin is alternately hot and cold; the secretion of milk is diminished, and about the fourth or fifth day a marked change in the appearance of the animal takes place. The abdominal walls are shrunken, the animals becoming lean, breathing quick and short, and do not have strength enough to raise themselves, and when raised cannot remain in that position for any length of time. The secretion of milk decreases daily, the secretion continuing until death, and is of a thick creamy character. The secretion of urine is also changed, the animal having a constant desire to urinate, succeeding, however, in ejecting only a small quantity of bloody urine. The fæces are discharged with great effort, and are dry and hard.

In this state the diseased animal lingers for a shorter or longer time, until it finally expires under appearances of exhaustion. The duration of the disease is from two to seven days.

Up to this time I have not been able to make as many post mortem examinations as I desired, owing to the great anxiety of the owners to remove the carcass of the animal as soon as possible; and owing to the few dissections I have made, cannot as yet arrive at any satisfactory conclusions with regard to the character of the disease. The following is the result of post mortem examinations made: An unusually early rigor mortis takes place (from one to two hours); abdomen much distended by gas; brain anæmic and soft; respiratory organs, found mucous membrane lining them, in anæmic state; in the trachea I found, upon opening, a quantity of mucous. Lungs pale, and at the base small hypostatic deposits; found no coagula in the heart, but from one to two ounces of thin blood, presenting an anomalous condition, as when the animal is for a long time dying, coagula are nearly always found. The muscles and valves of the heart were in a normal state. The stomachs filled with dry, solid, and half-digested food; want of secretion of the stomach; small intestines filled with bloody serum. The large intestine filled with

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a dry, solid, and half digested mass. The capillaries of the mucous membrane are injected, and small ecchymosed patches were found in the intestines. The annular veins of the muscular coat of the intestines engorged and enlarged. Spleen increased in length to twice its natural size; its peritoneal covering smooth, and stretched tightly over it; color darker than usual (a blackish brown); texture friable. The microscope revealed that the structure of the spleen had been totally destroyed, so that the normal elements of the spleen, viz., the corpora malpeghii blood corpuscles, and its peculiar networks, were no longer to be distinguished. Liver slightly enlarged. The liver cells contain a small grained substance similar to the commencement of fatty degeneration. Gall bladder much enlarged and filled with light green, fatty-feeling gall. Bladder much enlarged (nearly twice its natural state) and filled with a large quantity of bloody urine. Blood very thin, and seems to contain less red corpuscles than usual.

This valuable and instructive record by Sanitary Inspector Manheimer was accompanied by the following statement from Dr. Rauch: That he had that day examined a number of cattle at slaughter, which in the yards while living, did not present, to his eye, any positive symptoms of sickness, "but after examining the spleen, liver, and contents of the bladder, he found in many of them decided evidences of disease," and he further states: "I accordingly condemned the herds, so far as slaughter and sale is concerned, and shall allow no cattle to be sold as food unless inspected both before and after death." This important and judicious decision of Dr. Rauch was sustained by the Chicago Board of Health, and after consultation with Professor Gamgee, a plan for inspection was adopted which we shall mention elsewhere. In his letter of the 19th, Dr. Rauch informed us that the Chicago authorities had decided not to allow Texan or infected cattle to be brought to that city, and that such cattle, when found at Chicago, would not be allowed to be sent elsewhere. This action was fully in accordance with the desires of the Metropolitan Board of Health as regards the course which it was hoped the authorities of the State of Illinois, especially those of Chicago, would take.

In a communication received from Fort Wayne, Ind., and dated August 19th, the following information was forwarded to the Metropolitan Board of Health for its information. The action referred to is dated August 10th:

Upon information that some forty head of cattle had arrived here in a sickly condition, so that they had to be killed, we find, upon investigation, that there arrived here about the abovenamed number of cattle, in so bad a condition that they had to be killed, but that *they did not suffer from the so-called cattle disease*, and that the carcases were delivered over to the soap factory, and none of their meat exposed for sale. At a special meeting of the Board of Health, held to-day, it was

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Resolved, To notify Mr. Benton, the stock yard keeper, that the Board wishes to be informed if any more sick arrive, that they may personally inspect the same.

Resolved, Further, that it be the duty of the individual members of the Board to occasionally inspect the cattle yard during the hot season.

Dr. Rosenthal, the Secretary of the Board of Health at Fort Wayne, wrote to us on the 19th inst., and stated that the testimony upon which the abovementioned conclusions of their Board had been based, was "taken from persons who may not be able or willing to give the real facts, the carcases having been removed before we could inspect them. You will see that in the future we shall be very strict, and inspect all cattle arriving here *that are reported sick*. We will also publish that part of your communication relating to the care and transportation of cattle, as well as the suggestions in regard to disinfectants."

The mayor of Pittsburgh wrote as follows:

MAYOR'S OFFICE,
PITTSBURG, PA., *August* 22, 1868.

E. HARRIS, M. D., *Cor. Sec'y M. B. H., New York*:

DEAR SIR—In answer to yours of the 18th inst., I would state that our cattle yards at East Liberty, and elsewhere in this neighborhood, are free from all infectious disease, and no further alarm here exists on this subject. Our cattle inspector, Mr. Hosack, is very vigilant, and has taken every precaution against the spread of the cattle disease here. I have advised him of the tenor of your letter, and he informs me that he has received a communication from you, which he will answer in detail as soon as possible.

Mr. Hosack, the inspector referred to by Mayor Blackmore, wrote as follows:

SIR— * * * * * * * * *

The only cattle that were affected were the two droves from Illinois. I cannot inform you when or where the disease first showed itself. I discovered it on the arrival of the train. All the cattle on that train were more or less affected. After their arrival they were placed in the stock yards, near other cattle; in fact, I can say they were surrounded by other stock, but in no one instance did the disease show itself, save in the two herds above spoken of.

Out of two herds from Illinois (that arrived the first days of August, one of which was Mr. Alexander's, that you saw at Communipaw), forty-six died between Crestline, Ohio, and this city, and ninety-four died or were killed after their arrival.

There were two hundred and sixty-four in the two herds when they reached this city. The balance was shipped over the Pennsylvania Central railroad, as diseased cattle. The railroad company telegraphed to all points along the line of the railroad, that they were en route. They were shipped on one train, no other cattle being allowed on that train.

Yours, respectfully,
(Signed) WM. HOSACK,
Cattle Inspector.

[NOTE. The second herd was switched off at Harrisburg, Pa., and sent southward.]

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The subjoined extract from a letter received from the mayor of Altoona, Pa., the headquarters of the Superintendent of the Pennsylvania Central railroad, correctly illustrates the same hearty cordiality that is shown by the letters just quoted. It was deemed important to have all needed sources of information on the great railway lines of transportation readily within our reach, and to know the truth by frankly asking such questions as we desired. It is now known that many thousand head of cattle from the infected districts were kept back from transportation at the time when it was perilous to move them, and that this silent action in New York prevented both losses and panic, by eliciting, as it did, the kind of inquiry and sanitary supervision which were then greatly needed:

To the Registrar Metropolitan Board of Health:

Dear Sir—Your communication, dated August 19th, came duly to hand, and upon its receipt I called a meeting of the city council, to give advice in the premises; and they, by unanimous vote, directed the mayor to reply.

Your communication relates to two points upon which you ask for information: First: The condition of native and of Texas cattle which arrive here. In answer, we reply, that until the present time our cattle were entirely free from this infection, and we doubt not this will continue to be the case, from the fact that our city butchers are all men of character. They would not be guilty of so foul a crime as to slaughter diseased cattle and impose it upon the public for food. Second: Touching the course pursued by the Pennsylvania Central Railroad Company, in transporting beef cattle over their line of railroad, from Pittsburg to Philadelphia, it gives us pleasure to state that our meeting was honored with the presence and counsel of Edward H. Williams, M. D., the present efficient superintendent of the road; and he assured us, and authorized us to assure you, that the company have not, nor will they receive for transportation eastward, any beef cattle which have not undergone a strict examination by a commission of health officers, and also competent men of their own appointment, at their drove yards at Pittsburg; and for fear any taint of disease might break out on the way, they are re-examined again at Harrisburg, the capital of this State, by a similar commission. From that point, the Pennsylvania Central railroad to Washington *via* Baltimore, and the New York road *via* Allentown, diverges from the Pennsylvania railroad, and if any diseased cattle are here found, they are disembarked and dealt with according to State and municipal laws. Yours, respectfully,

(Signed) GEORGE POTTS.

Mayor's Office, Altoona City, Pa., *August 22d*, 1868.

Town authorities likewise gave information of the existence and progress of the disease at various points in the West. The town of Onarga, Illinois, for example, sends the following:

There has not been a case of disease, to my knowledge (and I think I am posted), within sixteen miles of our place. At Loda, a railroad station about sixteen miles south from here, there was a load of Texas cattle unloaded from the cars and

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driven east across the country to Indiana, which, I believe, is the northern limit where the disease has been. The native cattle there, having communication with the Texan cattle, or herded upon their track or herding grounds, have become diseased, and it has been very fatal, sweeping off nearly whole herds. The cattle in pastures along the track have not been affected. One farmer who had his stock, a part in pasture and a part on herding grounds (open prairie)—those herded, many of them died; he then put the two herds together in pasture, and not a case occurred among those that had been pastured.

The manner in which the Texas cattle communicate the disease to the native cattle, is a question not yet settled; the facts are, that the native stock do not seem to give native stock the disease, but that Texas cattle do give the disease to native stock while in apparent health. And native cattle herding on the herding ground of the Texas cattle, or herding on land where the Texas cattle have been driven over, do take the disease, and it has been fatal in most cases.

The largest estimate of the number of cattle having died from this disease in this vicinity, is about eighteen hundred, and the disease has shown itself only where the Texas cattle have been.

The authorities have taken every precaution to stop the spread of disease. The diseased herds, and also the Texas cattle are confined to their present localities, and heavy fines and imprisonment have been imposed for bringing into or driving through the territory not already infected. The people are determined that the disease shall be confined to its present limits, and I think the disease has nearly spent itself, and as soon as we have frosts it will entirely disappear.

By the approval of the president of the board of trustees of the town of Onarga.

Respectfully yours,

(Signed) E. C. HALL,
Clerk Board of Trustees.

The following letter proves how intelligently the leading agriculturists in the West have communicated the results of their observations:

ODELL, ILL., *September* 11, 1868.

E. HARRIS, M. D.:

DEAR SIR—I had the honor to receive your communication a few days ago. It is certainly gratifying to know that science has been called in to assist in solving the problem presented by the appearance of the plague; and although I make no pretensions to scientific ability, yet I may possibly assist you by giving in answer to your questions, the results of my experience and observation.

In answer to your first question, as to whether I have seen anything which would warrant me in believing that native cattle have propagated the cause of this disease, I would say that I have not. During fifteen years experience in stock raising, I have never, until this summer, witnessed any malady bearing the slightest resemblance to the disease in question. In fact, I have never before seen *any* kind of infectious disease among Western stock.

2. I have seen no indication of this disease among cattle arrived this year from Texas, and though numbers of them die when brought here, yet, as far as my observation goes, I consider their death the result of fatigue, and the want of proper care.

3. No case of the kind has come to my knowledge.*

* Question 3, in my letter to Mr. Atkins, was: "Has any case of this disease occurred in Texas stock that has wintered over in your State?"—E. H.

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4. The general effect upon milch cows is the same as upon other stock. In most cases the flow of milk is almost instantly stopped. In two cases which came under my observation of "cows with calf," the disease culminated in abortion, which was followed by immediate convalescence of both animals. Allow me to add here, in reply to an inference drawn from questions four and five, that in proportion to the number of all kinds of stock exposed to infection, more milch cows and beef cattle died than of other kinds. May we not presume that animals, in which the secretions of fat or milk predominate, are more subject to attack than others?

5. Milch cows seem to be very susceptible. Calves are not so. Not in a single instance have I known of a calf dying of the disease. Stock of a year old and over, are not exempt from its ravages, neither does the breed make any difference.

6. The only evidence I have that cars may become infected is that *every* spot in this vicinity whereon Texas cattle have been, has teemed with death to our native stock. Permit me to use the common expression, "*I would not give a postage stamp for a car-load of cattle shipped from here to your city in a car, if a single Texas beef had been in the car for only one hour* at any time from the first day of May until the first of November." So slight a contact is necessary to contract the disease that I have known cattle to die of it that had only been driven *across* a road along which Texas cattle had passed. Can any reason be given why cars may not become infected? Knowing what I do know of the nature of the disease, I do not hesitate to say that cars in which Texas cattle have been transported during the summer months are *reeking* with invisible death to our native cattle.

7. The length of time from exposure to attack varies from fifteen days to three months. My experience leads me to believe that hot weather will accelerate the progress of the disease, while cool weather will retard it; and an extended season of low temperature will effect a cure. The time from attack till death is from three to seven days, as near as can be ascertained.

8. To the best of my knowledge the first appearance of the disease in our county was on or about the 10th of August; and in the State about a month earlier. In our county the deaths number, as near as I can ascertain, ninety-eight; of the number in the State I cannot at present tell, though it must amount to thousands, for the scourge in our county has been light compared to what some of the neighboring counties have experienced. The number of recoveries, known to me, is ten, in our county. The proportion that sickened to the whole number exposed, has been as one to two and a half; or as two out of five.

9. In our county (I might say in our township, for it is the only place in the county where the disease appeared), we estimate the loss at about five thousand dollars; but I have no data from which to determine the loss in the State.

10. All that died were exposed to infection from Texas stock; so were all that are now living; which, with the exception of the ten mentioned in answer 8, escaped attack.

The route by which Texas cattle are brought into our State during the earlier part of the season was by Cairo, and thence they were shipped on the Illinois Central railroad to Chicago. Later, they entered the State at Alton, and were transported on the Chicago and St. Louis road to Chicago. Formerly, Missouri and Kansas suffered from the disease, occasioned by the introduction of those cattle. Within a year, however, mob law has kept them out of those States, and as there had to be an outlet for the stream of cattle from Texas, the tide was turned through Louisiana to the Mississippi, up which stream the animals were trans-

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ported until they reached our borders, then turned inland to spread a contagion which has baffled the skill of the most experienced men.

In conclusion, I would say that I have *no reason* to believe that native cattle, even under circumstances the most favorable for infection, will infect other native cattle. Not *one* of the many I have seen die of this disease but that was exposed to infection from Texas stock; and not *one* of those in this vicinity, now living, but that was exposed to sick native cattle. I have seen a calf, which is now living and in good health, that was suckled in succession by three different cows, which died of this disease in its most aggravated form; the little animal drew its food from them, while they were sick, and when the first died it was given to another, and so on, and the process had no deleterious effect upon its health. It had never been exposed to infection from Texas cattle.

Hoping what I have written may be of some service to you in your endeavors to ascertain the nature and laws of this terrible disease, and prevent further damage, I subscribe myself, Respectfully yours,

FRED. A. ATKINS

The subjoined note, from the pen of this very intelligent farmer, shows what very ample grounds he had for the opinions expressed in the foregoing letter. This note was published in *The New York Evening Post:*

ODELL, LIVINGSTON CO., ILL., *August* 31, 1868.

* * * * * * In the vicinity of my residence is a parcel of vacant prairie, containing about twelve hundred acres, which is used in common for pasturing stock by those farmers who live near by it. For several years past this has been the custom, and during the time there has not been the slightest indication of any epidemic disease; but on the contrary, the cattle have been remarkably healthy, and the land has been peculiarly adapted to grazing, it being well supplied with water, and an abundance of nutritious grass.

On the 25th of June last, about four hundred head of Texas cattle were unloaded from the cars at Odell, and driven to the prairie above mentioned, and they were there herded until the 28th, when they were reshipped for Chicago.

At the time those Texas cattle were here, there were one hundred and forty-seven head of native cattle heing herded upon the same ground. This number was divided into three herds. In one of these, containing twenty-seven head, the disease appeared on the 10th inst., and it did its work so rapidly, that in just two weeks from its first appearance twenty-four out of the twenty-seven were dead. Of nineteen head of blooded stock owned by the writer, only nine are now living, ten having died in one week. Such has been the rate of mortality among the remainder, that of the one hundred and forty-seven head above mentioned, sixty-six have died in three weeks; and, as near as can be ascertained, about one-fourth of the remainder are sick, beyond hope of recovery.

The figures I have given will serve to show the terrible malignity of the disease, and the certainty with which it accomplishes its work. Not only in this locality has the truth of my statements been manifested, but at Bloomington, below here, and Gardner above, the result of the contagion has been the same. At both these places Texas cattle were unloaded from the trains; and at intermediate stations, where no disembarkation occurred, the native cattle are free from disease.

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No better observations upon the cattle disease could be made than those by the intelligent gentleman whose letters we have just quoted. The experience of the intelligent agriculturists who, like Mr. Atkins, necessarily have had every incentive to seek for the true sources of the poisonous infection by which their herds were imperiled, and in some instances, swiftly destroyed, impelled them to ascertain the truth upon this subject.

The subjoined extracts from letters received from Dr. Thomas L. Neal, the efficient health officer of Dayton, Ohio, contain important testimony upon the subject of these inquiries. Under date of August 25th, he wrote:

DEAR DOCTOR—I received your letter relating to cattle disease in due time. Up to that time we had no indications of trouble in our midst, but, there being a herd of Texas cattle left a few miles from us, in due time we were doomed to suffer the same penalty which seems to follow these same pestiferous "long horns."

There are over a hundred Texas cattle grazing in a large field (over two hundred and seventy-five acres), where they have been since the last of June. Up to about 15th of August, no natives were infected; since that time eleven natives have died, and several others are sick. Yours very truly,

(Signed) THOMAS L. NEAL.

In a subsequent letter he gives the history of this infection, as follows:

The farm on which it occurred is nine miles from the city. The first native to fall sick was a steer, three years old. This occurred on the 16th day of August, and precisely forty-seven days after any possible exposure to pasture or paths trodden by the Texas cattle. The owner of the Texas stock, in order to make a short cut, drove his Texans through the field where this steer then was grazing. This foreign stock was less than one and a half hours upon and passing over that field. In the field thus exposed, there were one bull, eight steers, six milch cows, four heifers and two yearlings (one a steer, and the other heifer). Among those to sicken (and die, as all did), there were the yearling (steer), the yearling (heifer), two steers (two and three years old), and five cows (three, four, two, six and seven years old), nine out of twenty-one. There were six other cows in the same field with the Texans, all of which died, save one, and by the way, the only one to sicken and not die within five days. It has *not yet* fully recovered.

No instance occurred where a native contracted the disease which had not been exposed directly to the ground where the "long horns" had grazed. No ages or conditions (except the bull) seemed to possess immunity, as far as these observations extended. All of those dead were well-bred. The bull, however, was a thorough-bred Durham.

The first symptoms observed here were the drooping head and arched spine, and the tucked-up appearance of the flanks; the hair is lifeless; slavering, and from the first, with the cows, drying up of the milk. The droppings hard and dry, and covered with mucous; almost from the first, and a constant symptom, bloody

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urine. An early increase of animal heat; I did not take it, but there can be no doubt it is much above the normal standard. The gait was tottering, and a want of co-ordination occurred with all the cases I saw. Twitchings of the muscles, and a tremulous movement affecting the entire animal, but particularly the hinder parts. The animal "falls away" from the very commencement. As you ask for the "earliest symptoms," I shall not further particularize. There may have been some premonitory symptoms I failed to become possessed of, but from the first indications of illness observed, the duration of the disease was from three to five days. "The death-rate in total exposed," as nearly as I can ascertain, is about fifty per cent. As before stated, fifteen sickened and fourteen died. The post mortem examinations were not made under my immediate supervision, and as they are not satisfactory to myself, I will not trouble you with them.

Yours truly,

(Signed) THOMAS L. NEAL.

From Cincinnati, Ohio, the last week in August, the following facts were received: On the 19th of that month the health officer received information that the cattle disease was prevailing in herds of cows near Cuminsville. A Mr. Hogan had pastured eight of his milch cows at Jones' wood, where a herd of sickly-looking Texas cattle had been pastured during the latter part of June. Mr. Hogan's cows began to pasture there sometime in July. Seven of these eight cows died within three weeks after beginning to pasture there. A Mr. McCracken also pastured twenty-nine of his milch cows on the infected grounds near Jones' Wood, and in about ten days from the time they commenced to feed there the sickness appeared, and in the course of a few days thereafter nearly all the cows had died.

An abstract from the official report of this outbreak near Cincinnati, by Dr. Clendenin, the health officer of that city, is here subjoined:

On the 3d of June the last herd of Texas cattle were brought to Cincinnati, over the Ohio and Cincinnati road, and were put into stock pens. They remained there over night only, and, on being inspected by our meat inspectors at that place, they were found to be very poor, and covered with ticks. They were ordered to be taken out of the pen and out of the city, as they were unfit for food, simply because they were so poor. They were taken to Jones' wood pasture, eight miles from the city, where they were kept two days, and then brought back to the city. In the meantime there was a drenching rain, and the cattle were pretty well washed. They were put into pens at the Brighton stock yards, where they remained, perhaps, twenty-four hours, when they were removed for the second time to Jones' wood pasture, where they remained some three weeks, and were fattened up.

On one occasion some of those animals stampeded when going to water, and broke into the grounds and gardens of the village through which they passed. The animals with which they came in contact, or that were kept on the grounds over which they passed, took the disease and died. These facts I know, for I followed up every single case myself.

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These animals were finally spirited away and killed, I presume, for the Cincinnati market. As they were outside of the city limits, our inspectors claimed that they had no control over them.

Within ten days after the herd was removed from Jones' wood, twenty-nine cows were put into the same pasture, where they remained, I think, about a month, when the owner observed that the animals were ailing, and the symptoms described by the gentleman from New York (Mr. Gould) were precisely those presented by these animals; that is to say, the first manifestations were drooping of the head and ears, and that marked stare which he so well described. In the early stages of the disease, the animal sought the water, lying down in it, and plunging in the nose and face up to the eyes, holding the head in that position as long as was possible without taking breath. This was only during the early stages of the disease. During this time the temperature of the body was increased, as proved by actual observations made by the thermometer. They would then leave the water, and within four days from the time of the attack every single one of them died. I have examined twenty-four of those twenty-nine cows, every one of which died within ten days. I did not find any disease of the rectum, as Mr. Gould has described; that I found perfectly healthy. If there was any change, it was perhaps a little paler than natural.

I found one symptom to which the gentleman did not refer—interlobular emphysema—infiltration of air between the lobes of the lungs. That existed in every case, and in some cases was very marked.

There were two cows that were particular favorites of one gentleman who desired to save them. They were but slightly affected, and his own opinion was that they were not at all. He took them from the herd, and put them in a lot near his house, in which were two pet cows which had been kept entirely separate and apart from the Texas cattle, nor had they been brought into contact with his own diseased cattle, until those two cows, on manifesting the first symptoms of the disease, were put into the lot with them.

Under date of September 7th, Dr. J. F. Hodgen, President of the St. Louis Board of Health, communicated the following statement to us:

"In April, 1866, a lot of three hundred Texas cattle were shipped on the steamer "Lizzie Gill" to St. Charles, on the Missouri river, and thence driven to Lincoln county (about fifty miles). The stock stopped three nights on the way; in two weeks after they passed, native stock was taken sick and died, and continued to do so in those localities during the summer. * * * * Dr. Mattson, and his partner, bought last season, a lot of cattle (native, fifty), and put them in a lot where Texas cattle (healthy) had been fed. In ten days or two weeks they began to die of Texas fever, and continued to do so until the end of about three weeks, when he removed what remained to the country and gave them green food; only a few, and those were already sick, died.

From the observations of our health officer, the same thing is indicated. Cattle running about the stock yards where Texas cattle are received, are affected, while others near by but kept up closely, are not diseased.

It is clear to my mind that the disease is propagated through the excrements (droppings); that these, perhaps, come in contact with the food, and are taken by native cattle, or as in one case, the grass growing on soil impregnated by the excre-

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ments, is capable of bearing the seeds of disease. At any rate, there is one very well authenticated case in which a lot of cattle were put in a pasture in May that had been occupied by Texas stock in March, and these native cattle had the Texas fever; though in this case it may still have been that by nipping the grass close to the earth, some of the excrements may have been taken into the stomach.

I think it would be well to send a commission to the Southwest next spring, and provide for an extensive series of experiments with a view to learn by what agent the disease is transmitted. If we could be sure that it was due to droppings alone, it would not be a very difficult matter to guard our soil.

Respectfully,

(Signed) JOHN T. HODGEN.

The health officer, under authority of the St. Louis Board of Health, at a later date, communicated the following facts through the secretary of that board:

* * * * * The disease appeared with the early transit of cattle East, and gradually increased until about August 1st, then declined, and on September 17th, there were few or no cases occurring. I would also remark for the information of Dr. Harris, that the disease prevailed here almost exclusively amongst milch cows. The stock yards during the summer were in a healthy condition. The native cattle transported in the same cars that had been used for Texas cattle, were not attacked by any disease here, the disease probably developing itself after they had passed on further East. A few instances—not more than five bullocks sick and dying in transit—came to my knowledge. It was among our milch cows that the great mortality took place. In all cases the animals were permitted to run abroad, and, as the open pastures in the outskirts of our city that they frequented for food, were almost daily traversed by Texas cattle, it was there, I conceive, that the seeds of the disease were obtained. I met with, or heard of no cases among cows kept confined either to stables or their own pastures, except one instance. A large dairyman, in June, purchased some forty head of cows in Illinois. Shortly after arriving at his farm, a disease appeared among them from which they died rapidly. The disease did not show itself among his old stock; this may have been due to the segregation of the Illinois or sick ones.

From the best sources of information at my command, I would say that the disease has never wintered over here. Cold weather destroys the germ as effectually as it does that of yellow fever, and it is only on the advent of Texas cattle that it appears again. During the war there were no Texas cattle and no disease.

Cherokee cattle are accused by drovers of carrying the disease, whether justly so I cannot say.

I speak of the disease among our milch cows as the "Texas disease," but whether it was the same that formerly attended the passage of Texas cattle, I cannot positively say, as no correct descriptions of the disease as it formerly appeared could be obtained. I can neither say that it was identical with a disease as it existed the past summer in various parts of the country. The various reports, as made up in various parts of the country, must be compared before this can be determined. Of one thing I feel convinced, viz: that I have traced the disease here in many, many cases to a Texas poison—*i. e.*, that all the sick had frequented the trail or passage way of Texas cattle, and that there they received the germs that caused their death. * * * * * * *

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From my own observations with the scalpel alone, the organs most usually diseased were the kidneys, spleen and liver. Without entering into a description of the changes found in these organs, I would conclude by stating, that the disease seemed to be one of blood poisoning, the result of a special germ imparted in some way by Texas cattle. That no one organ was invariably and similarly affected in all cases, and although the kidneys, spleen and liver were in all instances more or less affected, yet one or the other of these organs would seem to have been *specially* attacked in different cases.

Very truly yours,

(Signed) JAMES W. CLEMENS, M. D.,
Late Health Officer of St. Louis.

The mayor of Akron, Ohio, communicated to us the following information, under date of September 10th:

* * * * In reply to your inquiries, under date of August 16th, I informed you that we had not seen a case of cattle disease in this part of Ohio. By the enclosed statement you will perceive that it has broken out in this and an adjoining county, through which Texas cattle were driven. These cases have proved the disease to be communicated by cattle being driven over a road upon which diseased cattle have traveled. Respectfully,

L. V. BINN, *Mayor.*

To Corresponding Secretary and Registrar M. B. H.

The following is an abstract of the facts alluded to, and furnished by this intelligent executive of Akron:

About two months ago a drove of some ninety head of Texas cattle were driven through the north part of this county, Northfield and Twinsburgh, on the way to Mantua, Portage county, where the owner thereof, a Mr. Frost, resides, and where said cattle are now being kept. While in attendance at the fair in Twinsburgh, on Thursday last, we learned that the disease in question had broken out upon the farm of Mr. G. W. Dresser, on the line between Twinsburgh and Northfield, near Macedonia, at which point said Texas cattle had made a slight halt upon their journey; while it was asserted by some, and denied by others, that large numbers of the Texas cattle had also been stricken down with the disease upon the farm of their owner, in Mantua. Desiring to ascertain the facts in regard to Mr. Dresser's herd, in company with M. C. Read, Esq., of Hudson, and J. P. Alexander and R. B. Walker, of this city, we visited the farm of Mr. D., who kindly gave us all the information in his possession in regard to the matter.

It appears that a tenant of Mr. Dresser living upon the north side of the east and west road, by the name of Maloney, having three cows which he had allowed to run in the road, had lost two of them suddenly, by the disease in question, a few days previously; while one cow, out of the large herd of dairy cows owned by Mr. Dresser, which, in going to and from pasture, had passed over the track of the Texas cattle, had also died from the same disease, the day before, after two or three days' illness only.

From M. C. Reed, Esq., of Hudson, Ohio, after a personal visit and examination at the place infected by the disease, we received

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a full account of these cases in Summit county. Though Mr. Read went about this inquiry fully persuaded in his own mind that it was only an endemic and local disease, the following points are so well stated and so instructive that we present them to show how well the Summit county outbreak corresponded with all that we know concerning the propagation of this malady. Mr. Read says:

* * * * * The Texas cattle were taken from the cars at Brighton, about the first of July, and were slowly driven by way of Independence, Bushnell, Northfield, Twinsburgh, Hudson and Aurora, to Mantua, where they now remain. The pastures were short and poor on account of the protracted drought, but the feed was more abundant along the sides of the roads, our laws restraining animals from running at large being generally well obeyed. The men in charge of the Texas cattle herded them at night in yards, &c., without feed, and then, during the day, permitted them to feed in the streets.

They reached Northfield July 4th, and the drovers permitted them to feed some time in the street, and at night shut them up in yards on Mr. Dresser's farm. They started them early in the morning, but again permitted them to feed for some time in the street. Within about fifteen minutes after these cattle were turned out of the yards, Dresser's cows were driven into it to be milked. A near neighbor, a Mr. Maloney, had at the time three cows and a calf, running in the streets. About the first of September the disease appeared among these cattle, and they were also found to be covered with the ticks. All of Mr. Dresser's cows, when I saw them, had more or less of the ticks on them, not a large number that were fully grown, but a multitude of small ones; some of the cows in apparent good health having many more of them than those that took the disease. He lost two cows; one died, the other was killed after the cow became hopeless. I was at his farm yesterday, his cattle are apparently in good health and the ticks have disappeared. Maloney's three cows died; the calf, which according to Mr. Dresser's statement, was literally covered with the ticks, did not take the disease. A Mr. Munn, of Northfield, living a little west of Dresser's, and on the route the Texas cattle were driven over, lost one cow. This cow was driven to pasture through the street. On careful inquiry, I am satisfied that the above is a full list of the deaths among the cattle in that neighborhood, which there is any reason to attribute to the presence of the Texas cattle.

Hon. Peter Hitchcock, a distinguished citizen of Geauga county, Ohio, has communicated to us the following facts:

* * * * * In Portage county, I think there has been none of the disease except in one township adjoining Summit county, where it was brought by a herd of Illinois steers, and if I am correctly informed, the same cattle that, coming through Summit county, left the disease there.

In this county (Geauga) there has not been a case of the disease. Of this I am very well assured. In Lake county I am quite familiarly acquainted with the cattle men of the county, and I am just as well assured that there have been no cases there except what happened upon the line of the Lake Shore railroad.

Painesville, upon that railroad, is a point where much the larger proportion of the cattle from the South and West, passing over that railroad, are unloaded, fed

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and reshipped; and my impression is that the herd to which you refer as from Painesville, was really a herd of Western cattle, falsely shipped as from that place, or else a herd that took the disease from an infected yard or car.

In answer to your inquiries, I would state that the "first cases" of which I learned were in Aurora, Summit county, taken, as I understand, from following in the track of the Illinois herd, to which I first referred. The exact date I cannot give, but suppose it was the same as that of the cases of which you were informed by Mr. Read and the mayor of Akron.

The disease, so far as I have known, depended upon exposure to grounds over which Texas cattle had been driven recently.

Very respectfully,

Your obedient servant,

(Signed) P. HITCHCOCK.

The foregoing extracts from correspondence are quoted chiefly with the view to convey the information and records therein embodied in the precise words of the respective writers. There was considerable correspondence with the State Commissioners and Assistant Commissioners, and with various persons engaged in handling cattle, but as all the points of information which such correspondence embodies are embodied in the report of Dr. Morris* in this volume, no further mention need be made of it in this place. But there is one point that ought to be mentioned here, namely, that the Board's correspondence has been an important means for imparting information to great numbers who sought it, and also for securing close observation and a reasonable supervision of the disease throughout the country.

During the progress of the infection in the country, there was reason to apprehend that, on the one hand, reasonable fear of the introduction of the disease into healthy herds might lead to embarrassments in the beef supply in the cities; and that on the other hand the drove-men aud butchers—true to commercial instinct—might push dying and hopelessly infected beeves upon our city meat markets, as, in fact, Assistant Commissioner Morris ascertained was continually attempted. To prevent or largely control these evils was an incidental and very important object, both kept in view and actually attained in the Board's correspondence. The daily press also discreetly sustained all the sanitary and police measures which the Board recommended, so that entire

* It is deemed desirable that so far as the disease came under Dr. Morris' official observation, it should be consecutively presented by him. As Assistant Commissioner for the State, he embraced every opportunity personally to see examples of the disease in different localities, and to aid the Board of Health in procuring the most correct information concerning the infected herds in the State of New York.

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success was given to the endeavors of the sanitary officers as regards their advice, as well as their acts. To insert here the entire correspondence, &c., relating to these matters, would needlessly burden this report with details; but we here introduced so much as seemed necessary to show what was the precise nature of the information obtained by us in the correspondence.*

ABSTRACT OF AUTHENTICATED EVIDENCE OBTAINED FROM VARIOUS SOURCES.

The earliest information of which the writer of this report had any information concerning the "Spanish fever," or Texas cattle disease, related to the spread of the disease from the fords of the Osage river sometime before the war of the rebellion. The earliest published account of it that has any definiteness and value, is embodied in a report upon it by Dr. Albert Badger, of Nevada City, Vernon county, Missouri, and published by the Missouri State Agricultural Society in 1866. From that report we extract the following well stated points:

This disease was first recognized as having been propagated by cattle driven from Texas some twelve or thirteen years ago (that is in 1852 or 1853), the disease having been in the county (Vernon) two seasons previous to its having been traced to Texas cattle.

From the first, it was found to be confined to the great roads or highways running through the county from the south, and finally it centered on the Texas cattle in the year 1853, by its being (discovered to be) confined to one highway through the country over which these cattle passed that year. On this road the disease was fatal, killing about fifty per cent of all the cattle along that road, and persons living near the water courses over which that road crossed, lost as high as ninety per cent. * * * * * *

* * * The symptoms of the fever and its fatality are agreed to by every person. The fatality is much greater in a *warm and dry* summer than in a cold and wet one, and the disease always ceases when the frosts and freezes have killed the vegetation.

Dr. Badger goes on to give perfectly accurate descriptions of the symptoms of the disease and of the appearance of the sick

* Portions of the correspondence that related to strictly scientific inquiries, will be found in the succeeding section of the report.

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cattle. His description of two classes of cases, or, rather of symptoms and phenomena, produced by the blood poisoning in the last stage of the disease, is true to the life, and exceedingly instructive. He narrates the circumstances by which the farmers of Vernon county discovered the real source of the infection that had entered their herds; also shows conclusively that the disease entirely ceased during the four years of the war, and that the first case of the re-introduction of it occurred in the autumn of 1865, when two pairs of oxen were bought in the South by a Mr. Box, and immediately infected the herds of three of his neighbors.

In June, 1866, a drove of Texas cattle passed through Vernon county, and about eight miles into the adjoining county of Bates, when the citizens resisted their further progress northward, and compelled them to return into the Indian territory by the same road they had entered Vernon county. The disease did not appear for some six weeks; and then it prevailed more mildly than usual, yet it killed about forty per cent of the native herds. It extended directly up to the very point, on the roadsides, at which the Texans had been turned back, and not a farm beyond that point.

Mr. John H. Tice, a citizen of St. Louis, makes the following statement concerning his early experience of the disease at Cheltenham, near that city:

The first cases I saw were in 1858, five miles west of St. Louis, in a drove of one hundred and eighty head of cattle, three-fourths were Texans, and the remainder native stock. In a few days after their arrival, the disease broke out among them; the first died on Saturday evening, and by Monday morning there were twelve dead, every one of them being of the native stock. The pasture was isolated, excepting on one side adjoining the turnpike. * * * *
In 1860, there was a large drove of Texas cattle opposite to the abovenamed pasture and south of the road. Some of the drove died. The disease soon appeared in the neighborhood cattle, nearly all of them being cows. I lost three cows.
* * * * * About the middle of October, 1866, some derangement occurred in the machinery of a cattle train opposite to my house, and the train was detained somewhere about three hours. On the train were Texas cattle, and as some Irish people employed on the road lived there, and who during the morning and evening pastured their cows within the enclosed railroad, I went and advised them not to let their cows in. One of them did, and one did not. The cow let in was a very valuable one, he having paid a short time before eighty dollars for her. In about ten days she sickened with the Texas fever, and died in a few hours. She pastured on the common when taken sick, with the neighborhood cattle. But the day after she died (on the 30th of the month), we had the first killing frost of that season.

During the summers of 1856 and 1857, Texas cattle were brought into the States of Kansas and Iowa in great numbers, and it is

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stated that the native stock was swept away by a "dry murrain" that prevailed along the trails traversed by the Southern droves. The newspapers of those dates, and of 1858, mention the singular circumstance that the course of the disease seemed totally arrested at the banks of any deep stream of water, excepting at the points where the Texas cattle found fording places, at which they crossed. From 1858 to 1861, the disease prevailed along various routes traversed by Texas herds in Missouri, Kansas and Iowa, and in the latter year laws were framed by the Kansas Legislature to regulate the movement of herds from the South. Similar laws were enacted by the Legislatures of Missouri, Illinois and Kentucky, and all of them are based upon the evidence of common observation of the disease, introduced and propagated by the presence or even passing of cattle from Texas and the Indian territory, bordering on Texas.

That this exotic disease wholly ceased in all the States here mentioned during the war of the rebellion, is a fact well established; and that it sprang into existence immediately after the war, along the trail of Texas cattle, which again were introduced as soon as the obstruction of military lines had ceased, is also a fact equally well established. Even in the famous Blue Grass regions in Central Kentucky, the disease made its way in 1866, as the following instructive instance strikingly illustrates: A drover brought a steamboat load of Texas cattle up the Mississippi and Ohio rivers, and, landing them at Louisville, drove on to Lexington, which is in the central part of the State. This drove was moved to Georgetown, and wherever the native stock of the districts chanced to graze upon the roadsides or pastures that were thus traversed by the Texans, the former were in the course of two months almost entirely swept off by the cattle disease. A drove of fat cattle that chanced to follow close upon the trail of the Texans were all attacked and all died. A Mrs. Duke, in Georgetown, who had a fine dairy herd, lost forty of her cows in consequence of their temporary exposure to grounds that had just been traversed by these Texans. These facts are all vouched by Mr. Benjamin Johnson, of Arcola, Illinois, who brought that herd of Texans into this most healthful and highly cultivated section of Kentucky.

Mr. V. P. Chilton, of Southwestern Missouri, has stated to the Commissioners of the Illinois Agricultural Society, that as a resident of that section of country both before and ever since the Texas cattle began to be driven through it (since 1849), he has observed the following facts:

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1. That beyond a doubt, the disease is communicated from feeding or watering with or after Texas cattle. He says:

I have never yet known a case that could not be traced directly to this cause. * * * * * * I have had my own cattle separated from large herds of Texas cattle by a fence, without any evil results, and of the immense number that have died on this road, none have died on pastures from which Texas cattle have been excluded. The instances to sustain this view are so numerous that I will not undertake to give them. My opinion is, that the poison is taken into the stomach with their food or water; the greatest danger being in watering in stagnant pools after infected stock, the known habit of cattle when watering, leaving much fetid and feverish matter in the water. In very hot, dry weather it is not safe to let cattle upon ground that has been used by diseased cattle for at least eight weeks after they have been removed, as I have twice known the disease contracted nearly that length of time after they had vacated it, and immediately after hard rains when it was thought the disease had been swept off by the water, but it was only washed into the water-pools with their droppings, and new energy given to the virus.

This intelligent observer adds:

Cattle that have been here a few months, seldom impart the disease. The fatality in cows appears to be greater than in steers. The disease is much more virulent in some seasons than others, the excessive heat of this summer (1868) causing it to be worse than usual.

Experience at Cairo.—This chief point of transhipment of cattle from steamboats to railroads, during the summer of 1867, in consequence of State prohibitions against the movements of Texas cattle over the routes of Kansas, Missouri and Iowa, early became a seat of the Texas plague. The first lots that communicated the disease, were landed from Texas, by way of New Orleans, on the 23d day of April, the second on the 26th, and so on, about thirty thousand head having been disembarked at this point during the spring and summer of 1867. The boat-loads that first arrived seemed to be in perfect health, but as the hot weather drew on, many Texas steers died on the boats and in the Cairo yards. The cattle were allowed two days for rest and recruiting after debarkation from the steamboats before being shipped northward upon the railroads, and it is stated that from twenty-five to thirty cattle died daily in the yards, and about the levee during the hot season at Cairo. The farmers in the vicinity of Cairo, suspecting no danger, permitted their native stock to mingle freely with the Texas cattle. But their cows began to perish by the disease early in June, and this fatality continued to increase until it plainly declared the

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presence of an epizoötic. This lesson was not forgotten, for during the past summer of 1868, the farmers very carefully kept their cattle out of the way of all contact and exposure.

Facts Showing the Probable Period of Incubation.—These facts appear to consist of two classes; first, the deduction from records of the time from first exposure to the fresh trail of infected Texas cattle; or, the time which elapses from the first arrival and presence of the Texas cattle and their excrements, to the date of the first outbreak of the disease in native herds; second, the time that may elapse between the first exposure and the first symptoms in native cattle, when that exposure is known to have taken place, after the infected grazing grounds or cattle trails had become actually capable of communicating the disease. In other words, there is a distinction to be made between exposure to the infection itself (*i. e.*, the contagium of the disease), and the mere exposure to the Texas cattle directly, or to their trail *immediately* after they passed.

With this preliminary remark, we quote the following facts: 1. At Cairo, in 1867, nearly six weeks elapsed after the landing of the first five hundred Texans, before the native cattle began to die by the imported infection, but after the outbreak had declared the presence of the infection, the period that elapsed between the exposure of native stock and the onset of fatal symptoms, was scarcely four weeks. 2. At Whitehall, Illinois, Mr. Gregory put two hundred and fifty-five Texas cattle into one of his pastures, in which fourteen native steers were grazing; this was done on the 20th day of June. July 18th, one hundred more Texans were placed in that pasture, and July 29th, he put in forty fat natives. Three (3) native cows were also all this while grazing in this pasture with the fourteen native steers, and after a lapse of forty-one days, these natives also had the companionship of the forty which arrived on the 29th of July. The following is the record of dates, etc., of the attacks that followed: (*a.*) August 8th, two of the three cows died, the other one having been sent away several days previously. (*b.*) August 10th, one of the fourteen steers died. (*c.*) Five days later, the fat steers that came in on the 29th of July, began to die, and these continued to die at the rate of five per day, until forty-four out of the fifty-four had died. (*d.*) Five cows, some Texans and a buffalo were placed in a pasture together on the 20th of June, and on the 8th of August, one of these five cows died. (*e.*) July 17th, there were forty-seven native cattle

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and two hundred and forty Texans placed together in a pasture; they have shown no signs of sickness.

Mr. Groes, a farmer living in Sangamon county, received a drove of cattle on the 16th of June, directly from Abeline, Kansas, and placed sixty-two of them in a one hundred acre prairie-pasture, where there were thirty-five native cattle grazing. Twenty-six days after receiving the Texas cattle, he removed two of the natives that had fed with them during those three and a half weeks, and placed them in a fresh pasture where there were no Texans; after twenty-four more days had elapsed, namely, on the 5th of August, the Spanish fever appeared in that herd of thirty-three natives. The two other natives that had been removed were now returned to their companions, and they continued healthy until the end of the season; but in less than ten days after the disease appeared in that group of thirty-three that had remained longest with the Texans, nineteen of them died.

This case, like that on Mr. Gregory's farm, seems to show that the infectious principle, or *contagium* by which the disease is spread from place to place, either requires, *first*, a period of several days and perhaps as long a period as four weeks, to develop it from the excrement of the Texas cattle as deposited on the ground, to such a maturity as to render it sufficiently active to propagate itself; or, *second*, it requires that the individual cattle which have freshly arrived from the Texas and Indian territory cattle-trails,—and whose incubation of the poisonous cause of the disease chances to be yet incomplete,—shall continue their incubation of it until it becomes capable of reproducing a crop of its deadly growth. None of the cases thus far quoted serve to determine which of these conditions it is that must explain the curious facts in the instances here mentioned.

The experience upon the great farm of Colonel J. T. Alexander, in Champaign county, Illinois, throws additional light upon the important question which we have here raised. On the last day of May, 1868, four hundred freshly arrived Texans were placed upon his farm at Broadlands, upon a prairie-pasture on which one hundred native oxen were grazing. The Texans remained in that pasture only one day. June 7th, two hundred and twenty-six more freshly arrived Texans remained one day in the pasture here mentioned. June 18th, four hundred and ninety-six more of the same kind, freshly arrived, were allowed to remain in the same pasture three days. June 21st, three hundred and forty-nine more

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arrived and remained there one day. June 25th, five hundred and thirty-seven more, by the overland route through Kansas, arrived and were placed in another pasture where twenty-two native cattle were grazing; and on the 30th of June, one hundred more arrived by the same route, and were placed in still another pasture with native cattle. July 26th the disease appeared among native cattle, and during the week it was observed in several different pastures. Now, concerning the one hundred oxen—native cattle—that were grazing in the great pasture which, from the last day of May until the 4th of July, had continued to be a sort of hotel-ground for the grazing and rest of immense herds of freshly arrived Texans day by day, but only for a day or two in each arrival, the following facts appear: (1.) These one hundred native oxen continued in the great pasture until July 1st, when they were all removed to a pasture in which there had been no Texan herds. (2.) That on the 14th of July twenty-seven of these one hundred oxen were removed to a pasture that had, for some time, been grazed upon by Texas cattle. Two weeks afterwards several of these twenty-seven sickened, and in the course of the month nearly all of them had the Texas cattle disease, and many of them died. In another lot of native cattle, twenty-six in number, which had grazed for twenty days with freshly arrived Texans in a pasture, namely, from June 10th to July 1st, not a case of the disease occurred, the cattle remaining healthy until the end of the season; they were removed from the Texans at the date last mentioned and placed in a pasture where no Texans had grazed. But a numerous herd of the companions of these fortunate twenty-six, that remained in the pasture where they had together grazed with the Texans during the last twenty days of June, and thenceforward for a month continued to graze upon the same pasture alone, before the middle of August were nearly all dead by the disease. These facts are all vouched by Mr. C. L. Eaton, the very intelligent superintendent of the Broadlands farm.

The experience in the Chicago stock yards was peculiarly important. We have already stated many of the facts in our chapter of correspondence, and we will here add a few more statements which seem important in the history of the disease in that neighborhood. Dr. Rauch, the Sanitary Superintendent of Chicago, says:

* * * * * The first case at the Union stock yards, which terminated fatally, occurred July 25th, soon after the arrival of the train that

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brought the animal there. Two days after, two dead steers were found in a train that arrived from the infected district (Tolono, in Central Illinois), with several animals suffering from the disease. The next day, another train arrived with diseased steers in it. This train was not permitted to remain. On July 29th, a cow died, belonging to a citizen of the Fifth ward.

The number of deaths increased daily until the 20th of August, particularly in the Fifth ward, when they began to diminish. In order that you may understand the history of this plague, I will state that the Fifth ward comprises a large territory, the greater portion of which is unoccupied, and in its primitive state, in the extreme southwestern portion of the city, adjoining the Union stock yards, and where, for the purpose of economy, herds of Texas cattle were grazed at intervals while awaiting sale, from the month of May until the action of the Board prevented it, in August. These animals were also grazed upon the prairie, east, south and west of the stock yards. No herds were at any time permitted to graze east of the Pittsburg and Fort Wayne railroad. * * * On this ground, the cows belonging to the Fifth ward grazed, and where the Texas fever prevailed most, and the greatest mortality occurred, A large number of cows grazed east of the Pittsburg and Fort Wayne railroad, but none of them were affected, with the exception of a few which were in the habit of frequenting a spot below the city limits, on the line of the Illinois Central and Michigan Central railroad, connecting with the stock yards, where the cattle cars were cleaned. These cows belonged to citizens of the Fourth ward. Other cases occurred near Calumet Junction, Summit, Lyons, and south and west of the stock yards, where herds of Texas cattle had been driven, or grazed, or where infected native cattle had been sent from the stock yards. One case occurred in the Seventh ward, of a cow that had been purchased several days before from a farmer living near Brighton, but which, at the time of purchase, showed no signs of the disease. As far as we have been able to learn, one hundred and forty-seven milch cows, one heifer and four steers, belonging to citizens of the Fifth ward, died between July 27th and October 10th. At the stock yards, thirteen steers died; in the Fourth ward (the extreme southern part of the city, and east of the stock yards), ten; and in other parts of Cook county, as far as heard from, ninety-five. Of the animals condemned and killed at the slaughter houses, there were seventy-eight. In these, the disease was so well marked that it was unmistakable, while a great many were found, in the incipient, and still more, in the convalescent stage, so that the Board did not feel unwarranted in condemning the animals. This was particularly the case with regard to the Texas cattle; six of these were found suffering with the acute symptoms so well marked that they were condemned, making a total of four hundred and one animals that died of this disease, and were slaughtered within the limits of Cook county.

The following observation concerning an important symptom, was made by Dr. Rauch:

So far no notice in the description of the symptoms of this disease has been taken of the chill by which it is ushered in, nor of the urination. With regard to the first symptom, I would state that three cases fell under my observation in which this was well marked, and I have no doubt but that such was the case in nearly all the animals that suffered. * * * * * * * *

With regard to the transmittal of this disease by native to native cattle, I must

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confess, that notwithstanding the weight of the testimony against it, I am inclined to believe that such can and does take place. I can see no good reason why such should not be the case. * * * Several instances of this character fell under my observation during the past three months, but the most conclusive evidence I have is, that native cattle were purchased at Chicago in August, and taken to Lebanon county, Pennsylvania, and that a short time after they died, and that other native cattle on the same farm and neighborhood died, and that no Texas cattle had been near the place

Mr. Hill, of Tolono, a little town in Illinois, where large numbers of the Texas cattle arrived from Cairo and from the railroad depot, stated the following facts concerning the experience in which he had participated as a citizen of the place. He says:

Our little town is situated at the crossing of the Great Western and the Chicago branch of the Illinois Central railroad. Great preparations were made there last spring by the Illinois Central railroad, and many thousand dollars expended, in building fine cattle pens and barns, which, although the road denied it, we supposed were intended (as the fact turned out to be), for the purpose of facilitating the importation of these Texas cattle. The first train containing any arrived on the 29th of last April, and they continued to come until late in the summer. About the 10th of June, the cattle disease broke out, and continued to rage as long as there was material for it to work upon, until nearly all of our cattle fell a prey to it. Among the few left, the disease still continues to work, one gentleman having lost some fine steers only last week. On the 5th day of September, within a radius of two miles of the town, I think there were *but two milch cows left*, and up to that time, seven hundred and twenty-six cattle had died in that little township, which polls but a trifle over two hundred votes, since which time two hundred more have died.

Concerning the isolation or quarantine of herds, as a means of arresting the spread of the disease, Mr. Hill states the following facts:

Some facts have been stated in regard to Mr. Larmon's cattle, and the disease not being communicated to them across a fence. As I am a near neighbor of his, I will just state what I know about that. His cows were among the last that died, but they did die, notwithstanding that they were enclosed, I think, by a common five-plank fence.

The district around Tolono having been so thoroughly infected that only two of the native cows remained alive after the 1st of October, it does not appear strange that this pasture of Mr. Larmon should have become infected at last. Mr. Hill does not inform us in what manner the water drains into or from Mr. Larmon's pasture, and there are several instances known to us in which pastures and yards which were receiving the water-shed of infected grounds and Texas cattle beyond their enclosure, and in that manner appa-

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rently became infected in turn; yet had not been actually visited or trodden by any Texas herds or other sick cattle before the disease sprang up among the native cattle, in the manner which Mr. Hill has well described in Mr. Larmon's case.

Mr. Hill, whose testimony seems to us peculiarly straightforward and logical, has recently given an account of the prevalence of this Texas epizoötic among the horses of the same district in which the cattle had been swept away before the horses began to die. He regards it as the same disease. He gives the following important evidence upon the two questions: (1.) Does the *contagium* of the Texas cattle disease persist in its activity long after the cattle have been destroyed by it in the pastures? (2.) What is the period of incubation in pastures that have become infected by this contagium in its full destructive force, or mature stage of development?

(1.) *Answer.*—After our cows had all died out, some eight or ten were brought from Edgar county; they had never been exposed to the Texas cattle ranges or trails, excepting as it was necessary for them to cross where Texas cattle had been driven. They were sold in our place, and part of them have died. * * *

(2.) Besides these cows, a large herd of native cattle that had not been in any manner exposed to the Texans, were brought into the town and pastured upon the same grounds where the disease had prevailed so fatally. In about three weeks they began to die, and continued to die until nearly all were dead. One farmer, alone, lost seventy previous to the first of November.

Mr. Moore, of Missouri, states the following interesting facts concerning the destruction of native stock taken southward to the borders of Texas, overland. His testimony is corroborated by an abundance of testimony of the same kind which has come into our possession:

Some freighters, about to cross the plains, selected native and Texas cattle, herded them, and fed them together during the winter; made up their teams in the spring, and started across the plains with all their animals apparently well. When they had got half way across the plains, the native cattle were all dead, and the Texas cattle were left to make the journey alone. These are the facts communicated to me by a gentleman who was with the train, and knew all about it.

There is abundant testimony to the fact, that Northern stock, particularly that which is well bred, seldom survives the acclimating diseases which they suffer upon being taken southward beyond the Arkansas and Osage rivers. But the nature of the acclimatizing disease is not yet well known to us. The Agricultural Bureau of the General Government, at Washington, collected important information upon this subject, nearly ten years ago. (See Reports of the Agricultural Bureau, Department of the Interior, 1860.)

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THE "TICK" THEORY CONCERNING THE DISEASE.

As some of the largest losers of cattle by the disease in the West came to the conclusion that the vermin known as "wood-ticks," which infested the skin of nearly all the newly arrived Texas cattle, were in some way the cause of the infection to native herds, we requested a friend who had examined into the history of the disease of the "tick," in Summit county, Ohio, to communicate the results of his investigation. The facts are simply these: The doctor and the farmer believed without evidence, simply in view of the fact that the "tick" seemed universally present with the infected herds, that the vermin served in some way as the cause and carrier of the disease. Our correspondent, M. C. Read, Esq., of Hudson, Ohio, forwarded to us specimens of the "ticks," and called attention to the following description of them by Cuvier:

Ixodes reticulatus (Lat., Fab.); ash colored, with small spots and small annular lines of a reddish brown; edges of the abdomen striated; pulpy almost oval. It attaches itself to oxen and is, when swollen up, five or six lines in length.

Texas cattle usually become extensively covered with these "wood-ticks," before leaving their native grazing grounds, and when they arrive at the North, during the early part of summer, they bring myriads of these vermin upon their skins. The cattle, as we are informed by Mr. Read, and several other correspondents, have never been observed to make any attempt to remove these vermin off their hides by teeth or tongue. And we need only quote the statement made, concerning this species of *Ixodes*, by R. D. Walsh, Esq., of Rock Island, Illinois, one of the most learned entomologists in our country:

There is a prevailing opinion amongst certain classes, that the ticks which are found on the cattle which die of Texas fever are actually the cause of the disease. In view of this fact, specimens of these ticks have been sent us for examination, from different localities in Illinois, and they are identical with those we have ourselves examined upon diseased cattle in St. Louis, and are but the common cattle tick. It is exceedingly improbable that they have anything to do with the disease, although it is barely possible that they may communicate the infection from the Texas cattle to our native herds. (See *American Entomologist*, Vol. I, No. 2, St. Louis, October, 1868.)

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IV. OBJECTS OF SCIENTIFIC INVESTIGATION, AND DESCRIPTION OF METHODS ADOPTED.

Plainly enough there are two leading and co-equal objects which demand that thorough investigations shall be made concerning whatever pestilential disease occurs in the animals that are used for human food. The first object relates to the ascertaining of the nature and effects of the special disease in the sick animal, with reference to the results to be feared or anticipated when their flesh is used for food; and the second object of investigation has reference to the discovery of the hidden and preventable causes of the pestilential diseases which afflict animal life, and with an ultimate and very special reference to the use of such knowledge in unfolding the natural laws of epidemics, and the practical principles of hygiene.

First Object of Inquiry—The Diseased Food Question.—That animals dying or killed when suffering from a pestilential and destructive disease, or when slowly undergoing the incubative effects of an infectious poison or ferment that at the full term of the incubation shall destroy life, would thereby be rendered unfit for human food, might seem to be decided, without argument, in the affirmative. But common observation has shown that not every kind of disease of the lower animals is *noticeably* pernicious as food when the flesh is cooked; and as the beneficent laws of our physical organization do actually provide in some degree for the protection of human life against many of the perils of defective foods, it has come to pass that the empirical conclusion has been drawn very boldly, that no cooked meats, however much the animals whence the meats were obtained may have been diseased, will produce disease or sickness. But this is a preposterous doctrine, and it is as absolutely untrue as it is illogical.

This report is not the proper place for examining into the whole subject of diseased foods, so we will simply state the questions that had to be considered by the committee of the Board of Health in regard to the matter.

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1. In consequence of an enormous increase in the death-rate by diarrhœal diseases, and especially in view of the fact that a sudden and utterly obstinate and incurable class of choleraic diarrhœas in adults, and in children past the age and diet of infancy, had very rapidly increased during the last weeks in July, and the first two weeks of August, in New York, we repeat what we have previously stated, that the chief incentive to our first search for the presence and characteristics of the "Texas cattle disease," had special reference to the well formed purpose to arrest, discover and control whatever removable causes of disease could then be found operating upon the population of the Metropolis. During the first ten days of August, the Registrar personally visited twenty-five sick, dying or dead persons to discover what local and domestic causes of choleraic disease might be present in the places where such sickness was occurring. At no hour of the night was he free from this duty of visiting cases of sudden sickness of this kind. Familiar as he was with Asiatic cholera and all forms of summer cholera, he found ample reasons for doubting if all the causes of this class of choleraic diarrhœas then prevalent, were adequately known and controlled. The precise state of our anxieties and of the general estimation of removable causes of some of the diarrhœal disease at the end of the first week of August, is correctly set forth in the note which accompanied the mortality records for the week ending August 8th, as usually submitted to the Board of Health. We quote a paragraph to show how medical officers regard the duty of searching for and restraining the sources of such excess of diarrhœal disease:

* * * * * There were 751 deaths in New York last week, and 267 in Brooklyn, against 730, and 233 in the respective cities the previous week. * * * Acute diarrhœal diseases are charged with 203 deaths in New York (40.34 per cent of the total mortality), and with 142 (53.18 per cent of the total) in Brooklyn. We regret to see that the fatality of this most preventable kind of disease, the unerring indicator of foulness and putrescence in domestic surroundings *or in food articles*, continues to increase, and there is just reason for saying that impure and injurious food has been sold in the markets of New York and Brooklyn. * * * And the fact must fearlessly be told that it is a crime against life to offer for food any portion of the flesh of the sick and infected animals that may for several weeks continue to be sent forward from the West. It is idle to talk of such meats being safe and wholesome for food. Medical officers are in duty bound to know the truth on this subject, and to advise accordingly.

Such was—and we believe such should be—the view taken of the use of the flesh of diseased or infected animals for food, especially

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when, by the symptoms of the sickness, the disorder is pestilential. How urgently important is this view of the case, when there is a deadly prevalence of bowel disorders in the community? And as sundry correspondents in newspapers, and some persons of fair authority in veterinary science, have expressed the opinion that the flesh of diseased cattle is harmless, it is but proper that we should quote here a paragraph from a letter of information which we received from Prof. John Gamgee, the distinguished veterinarian, who is at present in this country, then writing from Kansas City, Missouri, under date of August 22d, after having examined scores of the dead and dying cattle, and after having discovered the same disease in Texas cattle that were awaiting transportation from Kansas. That gentleman remarked, that "no sanitary officer can, for a moment, sanction the sale of the meat of diseased animals, whatever the disease for which they are slaughtered."

As medical and sanitary officers we do not feel at liberty to pass lightly over the questions that are involved in the consideration of this first object of scientific inquiry and sanitary regulation in regard to the foods derived from sick and infected animals. But as we cannot, in this brief report, properly take up the several questions that relate to this important subject, the following statement of the main points in the argument against the use of diseased animal food is submitted:

First.—The origin and early stages of various disorders of human health, especially of those affecting the healthy condition of the blood and secretions, and the digestive and the depurative functions, and, also, certain degenerations of vital organs and proximate elements of the human body, are very reasonably believed to be often dependent upon faulty food and consequent faulty assimilation; and as the peculiar manner in which the flesh of diseased animals sometimes operates as a virulent cause of fatal blood-changes warrants the conclusion that such food, even when cooked, produces its deleterious effects by operating as a morbid poison or ferment (*zyme*), every medical officer is in duty bound to discriminate rigidly against those special diseases of animals that destroy by means of pestilential disintegration or zymotic transformations in the blood and fluids of the diseased creatures. The entire class of anthrax fevers or anthracoid diseases, and all those diseases that are known by the term "braxy," are to be regarded as *liable*, though *not certain* in all cases, to beget disease of a fatal kind in man or beast, if used for food. Testimony on this subject is clear and strong.

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That the diseases we have just mentioned, as well as the rinderpest, the contagious pleuro-pneumonia, and the bovine-typhus, and all the disorders which the Germans term *milzbrand*, should not, in a majority of instances in which the diseased flesh is used as food, actually produce fatal results or any recognized disease in the persons who partake of the food, is neither strange nor important in this argument. Not every child takes scarlatina or the small-pox when exposed to the contagia of those diseases; and, on the other hand, not every human stomach will destroy, and not every human body will certainly and completely eliminate all noxious elements from the circulating blood. So, also, in and upon some persons parasites will grow and propagate, while other persons resist such depressing maladies.

In regard to our earlier opinions concerning the essential nature of the Texas cattle disease, we should here mention that until it was discovered that a cryptogamic organism was constantly to be found in the blood and bile of the infected animals, we believed that the malady would be found closely allied to the anthracoid and braxy diseases described by European pathologists. The cryptogamic and contingently infectious nature which we now know that the malady possesses, enhances the theoretical importance of restrictions against the use of such flesh for food. And, in regard to the whole subject, nothing could be said more appropriately than has been said by the learned and most practical of hygienists and pathologists, Prof. Edward A. Parkes, in the following remark:

> We should conclude from general principles that all diseases must affect the composition of flesh, and as the composition of our own bodies is inextricably blended with the composition of the substances we eat, it must be of the greatest importance to health to have these substances as pure as possible.*

In his fifth and seventh annual reports to the privy council of England, the chief medical officer, Dr. John Simon, takes up this question with a masterly grasp, and he arrives at the same general conclusion as that which Professor Parkes has so well expressed. In the light of experience and the most advanced knowledge, therefore, the terms in which the decision of the Metropolitan Board of Health was set forth by its special committee on the 13th of August, will stand as a safe and good rule.†

* *Practical Hygiene*, by E. A. Parkes, p. 161.

† METROPOLITAN BOARD OF HEALTH,
NEW YORK, *August 13th*, 1868.

In view of the rapid spread of the malignant disease that has burst forth among herds of cattle in certain portions of Illinois and Indiana whence beef is supplied to the Metro-

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The Second Object sought in the Investigations.—Search for the Causes of the Epizoötic malady with reference to the Laws of Epidemics.—The skillful study of epizoötics, especially those which affect the bovine species in open pastures, and in their removals or migrations from their native ranges of grazing, etc., has in the past half century, added much important information to the stock of medical knowledge concerning the causes of certain endemic diseases, and concerning various important questions in the pathology of such maladies. The human family has for seventy years been enjoying,—as a direct result of Dr. Jenner's skillful and scientific study of a bovine disease,—the greatest boon that medical inquiry has ever conferred upon man. The modern investigations concerning the "murrains," have finally classified them into groups of maladies that are almost entirely analagous to the most destructive epidemic and infectious diseases of the human family; and the scientific medical study of each group of them and of the outbreaks of them during the last fifteen or twenty years, has greatly aided the progress of a kind of practical knowledge that is much needed.

But, until the scientific commission which was appointed to investigate the rinderpest in England had completed their reports, there had but little been published in the English language that was adapted to aid sanitary officers in meeting the exigencies of an outbreak of a destructive epizoötic affecting the meat-supply of cities. The elaborate and thoroughly practical presentation of the whole

politan district of New York and the most populous portions of the Eastern and Middle States, this Board of Health has endeavored promptly to do whatever lies in its power to prevent the introduction of such cattle, and to exclude all such beef from the markets in this district. And however greatly it is regretted that farmers and the holders of the infected and sickly herds must suffer personal losses and inconvenience, the act of bringing forward and offering any such animals for food must be regarded as a very gross offence against the lives of our fellow beings. The investigations made by scientific and experienced officers of this Board have fully confirmed the opinion that the flesh of those diseased animals cannot safely be used for food. The information now before us clearly shows that until some proof of the contrary is obtained, the malignant disease which has been brought eastward from Illinois and Indiana, should be regarded and treated as an infectious fever or plague. The transportation of any sick or infected cattle from the sickly districts to other States should be prohibited. The offering of any such diseased animals, or any portion of their flesh for sale for food within the Metropolitan district of New York, will be regarded as a culpable offence against the sanitary ordinances relating to markets and food articles, and will be punished with the heaviest penalties the laws provide. No relaxation of this order of the Board can be allowed.

From the first hour that any officer of this Board had any information of the probable presence or approach of the infected herds near to New York, the utmost vigilance has been resorted to for the prompt and absolute exclusion of these cattle and every portion of their flesh from the markets. The greatest diligence and all available means are being employed in the investigations of the pathology and character of the disease, and its morbid results in the organs and flesh of the sick cattle.

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subject of diseased meat-supplies, however, had previously been made, as just mentioned, by the chief medical officer to the English Privy Council; and that presentation was made solely upon the ground of the particular necessity for carefully guarding our markets and the peoples' tables against diseased meat-supplies.

Epizoötic diseases, when of a pestilential or destructive character, usually make their outbreaks with great violence and rapidity of movement. And, as we are informed, there never has been an instance, until the present year, except under an Imperial government—occasionally, as in France in 1865–66,—in which an infectious epizoötic among beef cattle has been confronted from the first day of discovering its presence, and, so far as human ability and effort are concerned, held under absolute police control. The fact that this Texas cattle fever did not turn out to be so inevitably contagious as there was reason to expect and fear it might, did not diminish the duty of promptitude of official action. Indeed, it has resulted that this mode of action was essentially requisite as a means of investigating the disease with accuracy and success. This remark brings us to the postulate that should be laid down as the first rule to be established in attempting to exercise a sanitary control over, or to make an accurate and scientific investigation of any infectious and pestilential disease of cattle, sheep or swine that are designed for human food. It is as follows: Place every diseased animal in quarantine, and have all infected and suspected animals under strict observation and under sanitary regulations, wherever they are moved or kept.

Hitherto, or especially until the European States brought the rinderpest under scientific investigation and strict police control, there has been much difficulty in pursuing medical observations upon the pestilential diseases of cattle. On the one hand, it has been difficult—in the United States scarcely possible—for medical officers of health to pursue any adequate study of a bovine epizoötic. And, on the other hand, the descriptions and the pathological inquiries concerning epizoötic maladies were generally vague and unscientific.

The fact was known to us that there was such a malady as the "Texas cattle disease," or "Spanish fever," but no medical or scientific account of it had ever been published. It was also obscurely known that when improved Northern stocks of cattle (and horses also) are taken into the regions of the Gulf of Mexico, they suffer an enormous death-rate from some unknown and undo-

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scribed disease. This obscure kind of knowledge had, for the past ten or twelve years, been so vaguely reported, that really nothing was known of its medical history. The writer now recalls with much interest certain efforts he made, when passing from St. Louis to New Orleans, in the summer of 1865, in company with two gentlemen from the western border of Missouri and Arkansas, to ascertain what the geographical limits were of the "Texas cattle disease," or "Spanish fever," of which some indefinite kind of information had been received from southwestern Missouri before the war. But the war had suspended the disease, and it was only remembered as a "dry murrain" that destroyed native herds at and the fords of the Osage river. The information that during the last few months has reached us concerning the earlier observations of this disease, proves that it had for many years been vaguely known and described by the great drovers of cattle in the Southwest. We here allude to these facts for the purpose of showing that it was not possible, at the time when we first saw the disease, to refer to any published account concerning it, that could in the least aid the sanitary authorities in the duties which they owed to the public, in regard to measures that might need to be taken concerning the infected cattle. The chief objects and methods for scientific investigation by the Board's officers, had to be determined upon from the stand-point at which the diseased cattle were first viewed in the market-yards near New York, last August.

THE OBJECTS AND METHODS OF THE SCIENTIFIC INQUIRY.

Having reason to believe that this disease was allied to the anthracoid maladies, or to some specific and infectious pestilence, which, by exact methods of investigation, might be as perfectly understood as any great types of disease can be, and, believing also that whatever we might clearly demonstrate in regard to the origin, spread and morbid changes or pathology of this cattle fever, would directly promote the knowledge of causation, and the means of preventing epidemic as well as epizoötic diseases, we adopted impromptu the methods of inquiry that are indicated by the present advanced state of medical and sanitary science. These comprised:

1. The medical observation of symptoms.
2. The slaughter and post mortem examination of infected cattle with special reference to investigation concerning the disease.

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3. The continual use of the microscope in the pathological researches.

4. The employment of chemical analyses and tests.

5. Experiments to test the supposed methods by which the disease may be communicated.

6. Experiments and tests for the verification or settlement of questions arising in the progress of investigations.

With this simple plan of procedure, it was easy to keep up systematic inquiries. And it has turned out, in our experience, that this methodical organization of the means for investigation has proved to be an essential aid to the work.

The objects that most urgently invited the diligent investigation by these and other kinds of inquiry concerning the nature of the disease, after the food question had received adequate care, are objects towards which the desires and highest endeavors of physicians and hygienists may justly be directed; for, they relate to the larger and more exact comprehension of the physical circumstances and laws that are concerned in the cause and spread of pestilential diseases.

Here was a bovine pestilence that appeared to infect nearly all the cattle that grazed over the trail of freshly arrived Texas herds, and which destroys eighty per cent of all the Northern cattle that become obviously infected. And yet, notwitstanding this fatality of the unseen contagium, the contagiousness itself is subject to such contingencies and exceptions, that it the more strongly promised to aid in unveiling very important truths relating to the origin and propagation of certain pestilences that afflict the human family within limited districts. Yellow fever, cholera and typhoid fever variously represent the kinds of contagia and classes of yet undiscovered material causes which need, if possible, to be individually described, so that the hygienic control of them may be more definite and absolute. And, as regards a remarkable association of analogies that we have found to exist between the Texas cattle disease and the yellow fever, as witnessed in the human family, it may be remarked that we are now fully warranted in adopting the expression used by Dr. Stiles in his report, that the "Texas cattle disease, when judged by its pathological lesions, might be termed the yellow fever of cattle." A detailed account of these analogies need not be presented here, but it suffices to state that the points in comparison in these two pestilences are so well marked, as to warrant the belief that the actual demonstration of the precise nature,

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origin, propagation and pathological effects of the infective principle or virus of either of these two pestilences, would throw such a flood of light upon that of the other, as to enable medical men soon to grasp and unfold the hitherto mysterious laws that govern the propagation of yellow fever. Let it be understood, however, that we do not presume that these two pestilences are *identical;* we simply assert that they are wonderfully analagous in essential and constant attributes in their pathology, and in certain chief points, but not in all, of the phenomena and habits of their respective principles or agents of infectiveness.

Upon this subject the leading medical philosophers and hygienists of our day, have for some years past been urging the necessity and duty of making careful and thorough scientific investigations in regard to the infectious maladies which afflict cattle, sheep, and other domestic animals. It requires no argument to show that both the labor and facilities, as well as the satisfaction, in making exact observations upon tame animals that are wholly under the control of the medical observer and subject in all respects to his absolute authority, even to any kind of experimentation (experiments that are, of course, *not cruel, or barbarous*), and subject, at the observer's arbitrary decision,—to slaughter and to the instant examination of the blood and the tissue while they are absolutely fresh,—are conducive to the attainment of exact and trustworthy results, and to the discovery of the more important and recondite physical relations that most need to be understood in the history of infectious and epidemic or endemic diseases.

Epizoötics, thoroughly investigated in the light of modern science, can become, and indeed are becoming the most trustworthy aids to the correct interpretation of the conditions and principles connected with the propagation and the pathological history of pestilential epidemics. The time has come when the medical profession is demanding that the value of this kind of investigation into the pestilential maladies of the domesticated lower animals shall be more intelligently appreciated by all educated physicians who have opportunity for observing epizoötics. And we deem it due to the medical profession to state in this place that not a few of its most learned and practical members are at present pursuing this kind of study in various parts of Europe, and that for several years past the profound sanitary scholar and statesmanlike medical officer of the English privy council, John Simon, Esq., has continued to direct various investigations of this kind in the interests of the

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public health in Great Britain. In those inquiries the name of Professor Gamgee and the distinguished Dr. Thudichum have become associated with that of Dr. Simon. Dr. Lethby—the chief medical officer of health for London—and Dr. Henry Ballard, the medical officer of Islington (a district of London famous for stables and fevers), have done much to advance this kind of investigation. In connection with the English cattle plague commission we find that the chief value of all their royal reports consists in the results of scientific investigations by Dr. Charles Murcheson, Dr. J. Burdon Sanderson, Dr. W. Marcet, Dr. J. S. Bristowe, Dr. Lionel S. Beale and Dr. Angus Smith; while the Edinburgh committee for the same investigation consisted of such physicians as Dr. Littlejohn, the chief medical officer of Edinburgh, Sir James Y. Simpson, Dr. Lyon Playfair and Dr. Andrew Wood. These distinguished names represent the highest renown and scientific ability of the medical profession in Great Britain. In this list of the promoters of the kind of inquiry here referred to, we find the names of Sir Henry Holland and Dr. Wm. Budd. The Royal Academy of Medicine in Belgium, has for years made it a point of duty to promote this kind of scientific investigation; and throughout Europe this class of inquiries is regarded as eminently dutiful by medical men and by governments. But to the Metropolitan Board of Health and the Cattle Plague Commissioners it is not necessary to mention this testimony to the correctness of the principles on which they have acted in their official efforts to procure a suitable investigation of the Texas cattle disease. The subject is here referred to in this way for the purpose of promoting this kind of practical inquiry into the nature, causes and means of preventing both epizoötic and epidemic diseases. If there are among us any persons within the ranks of the medical profession or in public life who would affect to disdain such labors by medical or other scientific men, it would be a waste of time to offer evidence to them in support of the course pursued by the Board of Health and the State Commissioners.

But to return to the ground upon which the lines of progress in the needed advancement in medical and sanitary knowledge are now marked out, it is deemed desirable that the medical officers and members of the Board should put forth reasonable endeavors to promote the advancement of these topics of inquiry. This committee, and the medical officers of health in various cities, with whom we are now in correspondence throughout the United States and

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Europe, entertain the same opinion upon this subject which has been well expressed by Dr. William Budd, of England, in his admirable sketches of the epidemic variola ovina, or small pox of sheep. That greatly honored physician and hygienist, in the annual address which he delivered by appointment before the British Medical Association, set forth the views of the enlightened portion of the medical profession, as follows:

Statistics afford much information on epidemics; but it is all of a general kind. The really vital questions they leave almost untouched. Neither on the mode of being of the morbific agent without the body, nor of its mode of action, do they throw any but a dim and distant light. * * * * * * * *
What we want is some clue, however slender, to guide us through the obscurity in which the truth lies hid. New, exactly such a clue is found in that most remarkable of properties, the power which certain epidemic disorders possess of spreading by contagion. * * * * * If we were asked to define what other conditions we would desire * * * it would be that all the sufferers should be under our own eye, that their incomings and outgoings and intercourse with one another should all be known to us; or, better still, should be determined by our own will. It will be seen at once, that taken together, these conditions are not to be met with in human life. They are only to be found in the case of the domestic animals.

* * * * * * * * * *

What in the whole range of medicine is so striking as this invasion of the yet living and unbroken frame by a power, which, like an evil spirit of the olden time, unseen, untraceable and unbidden, enters in and takes possession, and holds riot and revels there, to issue forth again reinforced by a countless progeny? What so wonderful as this *imperium in imperio*, in which the majestic spirit that animates the human form is dethroned, and the noble form itself is often marred and laid in the dust, by a thing in comparison with which mildew and toadstool stand high in the scale of being.*

These are the thoughts of no ordinary physician, but of one of the greatest promoters of hygiene that ever lived; and these words were spoken to the chief leaders of medical and sanitary science and practice in England. In their endeavor to grasp the causes and the secret operations of human diseases, especially those of an epidemic and infectious type, physicians and hygienists are continually thwarted or hindered by the various circumstances which are peculiar to the social, moral and physical conditions that are characteristic of man, and of the very organization of society. For when we would undertake any exact demonstrations regarding the

* *Variola Ovina, Sheep's Small-pox, or Laws of Epidemics, illustrated by an experimental type.* Being the annual address before the British Medical Association, 1863. By William Budd, M. D., Hon. and Consulting Physician to the Royal Infirmary, Bristol.

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incubation or the exclusive operation of any contagium or infection in man, there arises the necessity and the difficulty of an arbitrary control of all the movements of the persons who become the subjects of such investigation. And then, even under imprisonment, the human being is sure to interfere in some way with the plans and details of the medical observations. So, likewise, the most favorable and essential physical circumstances for insuring correctness and completeness in the investigation of the anatomical and pathological changes that constitute or cause the disease, especially in maladies of the infectious and epidemic types, the *post mortem examination* is necessarily delayed in obedience to the sentiment of proper respect for the dead and for the grief of the friends; and in cases of convalescence, or partial recovery, or on the other hand, of lingering suffering and the slow approach to the fatal end, the way is necessrrily barred against the discovery of the most essential facts that need to be understood by the physician and pathologist; the very nature and sanctions of our moral nature forbid that we should so mar the human body, or proceed upon any investigations upon or within it, as in any manner would disturb the living occupant, or in any manner offend the sentiments of the living friends after death shall have left to scientific investigators the human body slain by the disease that is the subject of the desired inquiry.

But, in addition to all these obstructions to the prompt and exact researches in the pathology of diseases of the infectious and epidemic kinds, there is an insurmountable difficulty in regard to the exigencies, perils and alarms which always attend upon such maladies in the human family, when the claims of the sick and the dying demand the utmost sacrifices of the physicians' time and thoughts, and when, alas, the healer and student fall victims to the fatal infection of the malady which demands such sacrifices for science and its humane purposes. This view of the subject in question would seem to need no special illustrations beyond this mere statement of the case; but if any one chances to regard this as an over-statement of the case, let him revert to the experience of medical men in any great epidemic, even when not personally contagious, as in the visitations of yellow fever, a pestilence that like cholera, calls urgently for the most searching investigations. Even upon the inviting and airy grounds of the Quarantine establishment, in successive years, the present Registrar of the Metropolitan Board of Health, then in charge of the Quarantine hospitals, found that out of the great number of scientific physicians whom he invited

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to witness the phenomena and pathological effects of yellow fever, only two ventured to approach the hospital wards or enter the dead house.

The remark has justly been made by our excellent pathologist and microscopist, Dr. Stiles, in his special report, that the Texas cattle disease may properly be termed *yellow fever in cattle.* And, although it is not claimed that the cause of the Texas cattle disease and the mysterious contagium of yellow fever in man are one and the same, yet it is a fact full of practical importance and significance that this disease of cattle is the only one yet discovered and examined in the animal kingdom which produces identically the same pathological changes and all the essential phenomena that are found to characterise yellow fever in man. The writer speaks from very extensive observation and researches in each of these diseases when he states that the remark made by Dr. Stiles is, in his judgment, fully sustained by the constant attributes of both the diseases, and that it now seems probable that the medical profession will ultimately arrive at an exact and controlling knowledge of the great scourge of our American tropics and littoral regions by pursuing the same course of investigation in regard to it that we have pursued in regard to the Texas cattle disease; and it is not altogether improbable that the very lines of researches which have now been commenced so successfully in regard to the cattle disease may lead directly to the much desired discovery of the essential nature, operation, cause and external sources of yellow fever. The medical officer to whom the supervision of all these researches was committed, confessed at an early stage of the work, even before the end of August, the wonderful analogies which he and Dr. Stiles observed to exist between these two diseases, as respects changes, tissues and fluids of the victims, as well as in regard to some points connected with the incubation and effects of the infectious cause; so that the hope of being guided by this bovine pestilence back through its own natural history and upwards to a true knowledge of the exact sources and the nature of yellow fever and some other destructive pestilences, should inspire untiring endeavors to reach general results that will permanently benefit mankind after this new disease of cattle may have become extinct under improved sanitary care in the herding and handling of Western and Southern stock. The very direct bearing which this kind of investigation is to have upon sanitary science and the application of preventive measures against the worst pestilences that have,

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until the present hour. continued to afflict the human family, will ere long be well understood. Then will these labors which the Metropolitan Board of Health authorized its medical officers to undertake, be fully appreciated.

THE MEDICAL OBSERVATION OF THE SYMPTOMS IN THE "TEXAS CATTLE DISEASE."

The minute observation of symptoms in wild and restless bullocks that chiefly suffered the disease, was a difficult, and sometimes an impossible task. We have requested Dr. Morris to incorporate into his special report, all the tabulated records which the committee has been able to make upon this subject. It will be seen, by Dr. Morris' report, that the symptoms cover a diversity of facts,—the chief of which relate to the temperature, condition of the respiration and the respiratory organs, the pulse, and the excremental performances, especially the hæmaturia or "black water." The leading facts regarding the symptoms that deserved most attention from the medical observer are these, viz: (1.) A great increase of temperature, which is invariably noticeable at the earliest moment of *obvious* disease. Though no opportunity was afforded this committee, or Assistant Commissioner Dr. Morris, to make observations for four or five days previously to the commencement of the obvious symptoms in any infected bullock, there was no instance in which an observation of increased temperature amounting to 3½° above the natural heat of healthy bullocks—that standard being 100° Fah., or a fraction of a degree below 100°—was not followed within four days by the unequivocal evidences of the cattle disease. The first observations upon this point were commenced on the 8th and 9th of August, in Mr. Alexander's infected herd at Communipaw, and on the 11th and 12th, temperature observations were made upon five of the cattle that exhibited symptoms of the disease in Mr. Thomas' herd at Bergen, with the following result: The one least sick in appearance had a temperature of 104°, while one that was staggering and delirious with the disease, had a temperature of 109°; another, delirious but not staggering, 107½°; another, 107½°; and another, very feeble, 105°. On the 13th of August, the animal that was delirious and staggering twenty-four hours previously, and now unable to walk, had a temperature of 106° in the rectum, and 106½° in the blood of the aorta at the moment of slaughter. The other bullock that had a temperature of 107½°, was found in a dying condition on the 13th, and had, a

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moment before slaughter, had a temperature of 107° in the rectum, and 107¼° in the blood of the aorta at the time of slaughter; while that bullock which, on the 12th, had a temperature of 105°, was found to be in a dying condition, and had a temperature of 106° in the rectum and the blood of the aorta at the moment the vessels of its neck were severed.

Persons who did not witness the disease, might reasonably inquire if this feverish temperature was not the result of inflammatory action or excessive irritation, incident to the hardships of transportation; and this was a question which the committee caused to be thoroughly investigated, with reference to cattle that were arriving under the circumstances, and at the same time obtained in reference to the sick herds; it was proved that the temperature of all cattle, excepting the victims of this infection, gave evidence of but slight increase of temperature under any circumstances, and that an increase above 103° Fahrenheit, was not observed in any other than infected bullocks, and that there were only three or four instances in which the uninfected animals steadily exhibited a temperature above 101°. The average of all the temperature observations taken of the infected bullocks was nearly 105°. The mean temperature of the central part of the liver, taken from ten to fifteen minutes after the animal ceased to breathe, was 104½°.*

(2.) Evidences of toxæmia were early observed to be among the very first symptoms of the obvious stage of the disease, constant unrest, a faltering gait, a partial paralysis, occasionally a kind of paraplegia, the sick animal in such cases reeling or actually falling down upon his hind-quarters; and in some instances, the urinary bladder remaining distended and almost continually leaking as by a kind of enuresis, the symptoms in short being those which pertain to failure of innervation, in consequence of some kind of poisoning, or from some fatal change in the condition and chemistry of the blood. But chief among this group of symptoms is the disturbance of the senses, and the occurrence of a kind of delirium.

Further details of this class of symptoms need not be mentioned here. The evidence of the operation of a morbid poison is the subject to which attention is invited; and, whether this poison be derived from an external source, as some kind of contagious matter,

* The practical utility of thermometrical observations has been strikingly illustrated in the dealings which the sanitary officers have had with cases of the Texas cattle fever. The pestilential type of this fever was unequivocally asserted by this test alone, even in cases in which the obvious symptoms had not yet appeared.

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for example, or some parasite, or whether it chances to be a product of morbid changes in the proximate elements of the circulating blood, the fact that such a condition of empoisonment occurs, is important and suggestive.

(3.) The evidence of dissolution of the proximate elements of the blood appeared in a special group of symptoms as well as in certain general phenomena. The "black water," or hæmaturia is the constant symptom of the breaking up of the blood globules; while the marvelous increase of temperature in the infected animal, the ecchymoses and engorgement of nearly all vascular organs and tissues, such as appeared in nearly all the cattle that died or were condemned, must be regarded as *general* symptoms. The bare fact that a destructive disorganization of the blood was not only the invariable result in all the cattle that died or were slaughtered in consequence of the malady, but that wherever the infection was introduced among herds, the farmers and common observers recognized the disease by the term "black water," or "bloody water," shows how invariable was this pathological change.

To ascertain the causes and the history of these destructive changes in the blood would be almost equivalent to gaining access to the entire line of the facts which are concerned in the causation of the disease. Hence the class of symptoms here mentioned, together with the minute and general changes which the tissues of the infected animal suffered in consequence of the changes in the blood, and especially certain morbid conditions of the liver, the bile and the spleen, that would morbidly affect the blood, became the objects of special study. The researches of the microscopist and the chemist were of the highest service here. And there is reason to believe that the very discriminating study which these scientific experts bestowed upon the questions that were submitted to them in regard to the physiological and chemical events concerned in the spoliation of the blood, will be among the most permanently useful labors of the whole investigation. The symptoms and phenomena that indicated these destructive alterations in the blood were worthy of the distinguishing importance that has been attached to them both by the herdmen and medical men.

(4.) The careful examination of the flesh and all the organs of beeves that came under suspicion in various abattoirs, with regard to the healthful conditions that might be discovered in such meats. This *post mortem* observation very frequently was resorted to by Sanitary Inspector Morris, as a means of verifying or of correcting

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opinions or suspicions that were based upon slight or equivocal symptoms in the living cattle, or upon equivocal records of the herds. As will be seen in Dr. Morris' special report, there were numerous instances in which the opportunity for the observation and testing of symptoms in living cattle that were under contract by butchers, was so unsatisfactory, that the post mortem observation of the carcass and its viscera was deemed important. The fact should be stated here, that these post mortem observations—and we now refer to the mere *inspection* of the carcass and the abdominal viscera—so completely confirmed the trustworthiness of the thermometrical observations and the special symptoms of the advanced or obvious stage of the disease, that Dr. Morris finally relied exclusively upon the self-registering rectum thermometer and his own personal inspection, during the most trying periods of his service as Assistant Commissioner for the State. When it is considered that the latent or incubative period of the disease is protracted through several weeks—always more than fourteen days—and that the temperature test never was resorted to in vain when a doubt existed, and that the post mortem inspection of several thousand beeves, by Assistant Commissioner Morris and his aids, lent full confirmation to the conclusion that increased temperature was the first, most constant and sure of all means for ascertaining the existence of the disease at any stage in which its presence and effects can in any manner be ascertained, the importance of the records of temperature will be conceded.

(5.) Lastly, the observation of the symptoms of recovery or convalescence became important in the study of the disease. The opportunities for such observations were rare indeed. The five sick bullocks that were given up to us by Mr. J. T. Alexander, for observations and medical experimentation, as well as for ultimate anatomical examination, were too wild and timid to allow of satisfactory observation of the temperature and other intimate symptoms daily. Greatly as this circumstance was regretted, in these most instructive cases, the general observations upon the progress of those cattle towards recovery will be perused with interest. They are recorded in Dr. Morris' contribution to this report. It will be noticed that the temperature of the first of that group of convalescents, at the date of his slaughter and on the seventh day of convalescence, was 103¼° Fah. This is precisely 3° less than the temperature observed in the same bullock one week previously,

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when he was passing bloody urine and exhibiting all the symptoms of the advanced or obvious stage of the disease.

Though the five infected bullocks here mentioned constituted the only group of convalescent cattle without complications, which were observed throughout the entire period of recovery, or from the commencement of symptoms of recovery until the end or until slaughter, there were numerous instances (in all about thirty cases) in which bullocks were brought under Commissioner Morris' official observation, when in some stage of partial recovery that had become seriously complicated by excessive or incurable lesions, or by fever and fatal prostration, in consequence of the severities of hurried transportation. If the medical reader of this report will turn to Prof. Chandler's tabulated analyses of the blood of some of these convalescents, the state of the blood in the instances here referred to will be seen to account for the fatal results which ensued in convalescent cattle when subjected to the hardships of transportation or to dry food, etc.

We have referred to the recovery of five cattle under very favorable hygienic care and antiseptic medical treatment at Communipaw. And it is proper that we should express the conviction we entertain that every one of them would have died in a very few days if they had been driven to the butchery sheds in the heart of the city and there put upon hay diet and hard usage. We beg leave here to append the latest statement from Dr. Snow, superintendent of health in Providence, concerning the ultimate result of his observations in the case of the convalescent and imperfectly cured bullocks that were under his official direction, and concerning which we have given some account in a preceding section of this report. The group here referred to fell sick on arriving at Providence, the first week in August, and the owners promised the medical officer that he should see the survivors at slaughter, some time in December, if they recovered flesh by that time, as they had no doubt they would before the expiration of five months. As Christmas week was the time designated for the slaughter and examination, we have waited until the printing of this report has been commenced. Under date of January 7th, 1869, Dr. Snow writes:

* * * In relation to those cattle which were sick last summer, I am informed that *they have not grown fat*, and are *unfit for beef*. It is, therefore, yet uncertain when they will be killed. The promise is continued, and I presume will be remembered, that when it is proposed to kill them, I shall have due notice and opportunity to examine them.

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It will be seen from these records relating to medical observations upon convalescent cattle in this disease, that like all other observers of the malady, the assistants of this committee came well nigh losing all opportunity of studying the phenomena and history of convalescence. Fortunately we had some rare chances for this class of observations, and they were improved. But had it not been for the unceasing watchfulness of Assistant Commissioner Morris, who permitted no suspected bullock to escape his personal inspection, and the test for the temperature and other symptoms, some of the most instructive illustrations of the disease would have remained unobserved and unrecorded. The explosive suddenness with which the fatal stage of the disease occurs, the rapidity and brevity of that stage, and the readiness with which the dying animals could be, and for a time were, sequestered, or abandoned unclaimed, and—most important of all—the rapidity of the putrefaction that immediately ensued upon the death of the diseased bullocks, rendered it a difficult and vexatious task to carry out the plan of searching investigation we had adopted. Distance, weariness, hunger, storms, the rapid transportation, and the quick assembling of all the necessary assistants in each post mortem examination, were very essential means to the successful results that attended these efforts.

Such has been the history of our efforts to secure a reliable series of medical observations upon the Texas cattle disease. These efforts were necessarily made under circumstances of very great inconvenience, in open yards or pastures, upon wild and timid bullocks, with no skilled aids to trust, except the few overworked medical officers whom we have here mentioned, and with only an occasional opportunity to continue the observations for more than thirty-six hours in any one case,—so rapidly fatal was the malady in its stage of obvious symptoms. Imperfect and incomplete as the series of observations continued to be, untiring endeavors continued to be put forth to correctly observe the essential symptoms of the disease in each group of infected cattle that came within reach of the medical officers who had undertaken this inquiry: and it was by persistent and unvarying adherence to the original purpose and plan of the observations that anything worth having was ultimately accomplished. The total results of the medical observations may, therefore, be summed up as follows:

(*a.*) The duration of the period of obvious symptoms of the disease is brief, and so far as our observations and other researches

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can be said to have determined anything in regard to the onset and progress of this short and last stage of the malady, it seems not only to be a paroxysmal stage or period of the disease, but likewise seems to be a *single paroxysm*. That is, the Texas cattle disease, considered with reference to its *obvious symptoms*, is a *fever of but one paroxysm*.*

(*b*.) The symptoms come on, at first, in so sudden and violent a manner as to have led to the remark in every group of cases we have witnessed in Northern (native) cattle, that the *obvious* manifestation of the malady comes, as the French say, "*par explosion*," or with suddenness and violence.

(*c*.) The symptoms, as well as the observations that have been made in the numerous post mortem examinations at all stages of the disease, plainly declare the fact that the destructive or disorganizing changes which occur in the proximate elements of the blood, and in the special degenerations of tissue in the liver and spleen are *very rapidly produced*, and that the logical evidence is clearly in favor of the hypothesis that the structural lesions which ensue in this malady mainly occur during the obvious brief period of symptoms. But the symptoms do not yet reveal the extent of the congestive and other changes that may be going on in the liver, stomach, spleen and kidneys for weeks previous to the explosive or phenomenal and obvious stage of the fever. Such morbid conditions are reasonably inferred by other than the symptomatic evidence.

(*d*.) The symptoms connected with the appearance, posture, respiration, pulse, successive changes in the progress of the fatal or *obvious* stage of the disease, as all that is indicated by the temperature changes, and by the phenomena attending the death of the infected cattle, completely harmonize in the conclusion that all these symptomatic conditions indicate the rapid and fatal operation of a morbid poison, or a combination of poisonous agents. And further, it is demonstrably certain that the invasion of the blood or blood and tissues by that poisonous agency is rapid, and comparatively, that it is sudden; or, that the powers of life do succumb to its morbid power very rapidly and suddenly. So clearly was this

* The medical reader of this report need not be reminded that this peculiarity in the type and phenomena of the Texas cattle disease renders it strikingly analogous to yellow fever in man. And it should here be remarked that the observations of Dr. Rauch and Mannheimer, in the infected cows at Chicago, establish the fact that the *obvious* or last stage of the disease is ushered in by a *chill*.

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fact indicated in our earlier observation of the symptoms and phenomena of the disease, that it led to very scrutinizing search for the morbid *cause* by means of the microscope and chemistry. In other words, the symptoms guided and impelled us to those exact researches which were subsequently made in regard to the pathology and causes of the disease. This has been, therefore, a strictly medical and logical kind of investigation, from first to last.

THE SLAUGHTER AND POST MORTEM EXAMINATION OF INFECTED CATTLE.

This duty was deliberately undertaken, as was noticed in the first section of this report, as soon as permission was obtained. The task was, in all cases, an unpleasant, toilsome and expensive one. It was not a self-imposed task, for it was a *duty*.

Familiar with the history and requirements of the more exact methods of pathological and medical investigation, the Sanitary committee and medical officers of the Board of Health foresaw many difficulties which they had reason to fear might prevent success in the effort to push such investigations as were essential. 1st. The suddenness of each discovery of the sick bullocks by the Sanitary Inspector and State Commissioner at the herd yards, and the rapidity with which the fatal stage of the disease ensued, rendered it difficult to make arrangements for a post mortem in season to find the animal alive at a suitable hour for the inspection. 2d. It was deemed essential that everything pertaining to the post mortem investigations should be attended to immediately after killing the diseased animal, and this involved great sacrifices of time and convenience, besides much cost and vexation. 3d. It would almost certainly be found impossible to make perfect work in all the needed branches of investigation, and some points would necessarily be omitted.

The importance of the researches seemed to justify the attempt then, and as the medical members of the Board that constituted the sanitary committee, advised the effort to be made, the duty was plain. But in presenting the chief results of the effort, it is due to all concerned that the fact should here be stated, that the ability or means for prosecuting all this kind of labor depended upon the voluntary labor and sacrifices by two or three persons who greatly desired to see the whole work and responsibility assumed by other hands. From beginning to end this class of investigations required infinite toil, patience and rigid regulations for its execution.*

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The various sketches which have been prepared in chromo-lithography, to illustrate and explain this report upon the disease, have been executed with great faithfulness. They are especially valuable as showing precisely what lesions occur, and by what distinctive marks and colors they are distinguished at the hour of the slaughter and death of the sick bullocks.

In the selection of examples for these sketches of the pathological changes in the disease, there was a careful avoidance of all exaggerated cases or excessive alterations. It was deemed useless to attempt to sketch for printed illustrations, any of the excessively marked results of the disease; for example, the cases in which the kidneys had become disorganized, or the spleen had become a mass of diffluent pulp, or, as was occasionally witnessed while the bullock yet lived, the tissues being inflated by the gases of putresence and decomposition. The sketches relate solely to the average classes of cases of the disease. They were all animals in good flesh and full development, excepting only a few convalescents that were, of course, emaciated by the continuance of the disease.

The first fact that impressed the medical officers concerning the morbid changes produced by the disease was, that the putrefactive process was in full operation almost immediately after death, whether the death was by the pole-ax and knife, or by natural exhaustion. It was all-important, therefore, that whatever post mortem investigations were made, should be attended to in slaughtered bullocks, and instantly after life had ceased. That this tendency to speedy decomposition was not due to peculiarities of the weather, or to any other cause than disease itself, would plainly appear from the fact that the cattle, horses and other animals that daily died in the Metropolis from other causes, did not undergo such rapid decomposition, nor, especially, did any of their viscera undergo such putrescent disorganization as was found to be the rule in regard to the kidneys, the spleen, the liver, and the fluid blood of the infected cattle. As mentioned elsewhere in this report, these fermentative (zymotic) changes were, in some instances, so fully established before the dying animals had ceased to breathe, that it was found in the dissection which instantly followed the slaughter, that putrescent disorganization was already in progress in the viscera here mentioned, and that gases, resulting from the general decomposition, already filled the capillary blood vessels and the surrounding tissues.

The second very essential fact revealed in the post mortem

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examinations, consisted in the greatly increased size and weight of the liver, the spleen and the kidneys, and in very important pathological alterations in the two viscera first mentioned, so important and peculiar indeed, when examined microscopically and with precision, that no ground of doubt now remains that certain of these morbid conditions may justly be regarded as trustworthy guides in discriminating between undetermined causes and kinds of disease in dead beeves inspected at abattoirs, or in cattle when found dead or brought to slaughter. Yet, this kind of pathognomonic evidence found in the liver and spleen by the microscope, is so constantly associated with several morbid changes which are visible to the naked eye and other ready aids to a judgment, that for ordinary purposes of sanitary and market inspection, the latter can always be relied upon with tolerable certainty. A summary of these conclusions upon the post mortem inquiries will be found at the end of this chapter.

RESULTS SOUGHT BY MICROSCOPY, CHEMICAL ANALYSES, AND THE EXPERIMENTAL TESTS.

The practical usefulness of the microscope, however powerful and perfect the instruments employed in the researches of pathology, is so largely dependent upon the experience, skill, and good judgment of the medical observer who uses them, that it is hardly necessary to mention the particular quality of the instrument which Dr. Stiles used in his examinations. But as we have ascertained by correspondence with several good microscopists in Western cities where the disease was being observed, that it has frequently been found impracticable to bring into operation the degree of excellence and power of glasses which Dr. Stiles was employing, we will mention, in his own words, for readers who may desire to be informed on this point, that "the more delicate researches were made with a 'Hartnach immersion system,' magnifying, with No. 4 ocular, one thousand diameters."

All who witnessed Dr. Stiles' demonstrations in the field (or the abattoirs) were fully impressed with the remarkable clearness and penetration of his glasses, and with the nicety and skill of his manipulations of the elements that were brought under examination. And as the plan of the pathological researches required that all final conclusions must be based upon results of examinations made of tissues and fluids taken freshly from cattle killed and dying in presence of the medical officers directing the investiga-

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tions, there is a trustworthiness in the microscopical and other pathological researches in this inquiry such as has rarely been attained. Numerous cattle that were found dead or that died in the absence of any medical observer, were examined minutely, but the conclusions in this report are based upon none of those examinations, though the latter were generally instructive and corroborative in their bearings upon the medical history of the disease.

As the microscope had, in skillful hands, during the past few years, revealed the essential character of certain morbid changes that now enable us to determine the nature and name of the fever that has destroyed the life of a person found dead, if the point of inquiry be whether yellow fever or the malignant congestive fever were the fatal disease, and as chemistry had also come to the aid of the physician, in discriminating between various diseases and between different causes of pathological conditions, it was reasonably hoped that some progress towards the ends desired in the cattle disease inquiry would result from the use of these aids. Precisely what results have been reached will be seen in detail in the chapters contributed by Dr. Stiles and Professor Chandler. Taken by themselves,—each fact and each result separately,—the real value and significance of the separate portions of all this work cannot be correctly understood. Therefore we will here present a brief summary of the total results attained in the investigations which have been made.

SUMMARY OF RESULTS IN THE PATHOLOGICAL INVESTIGATIONS.

I. CONCERNING THE ANATOMICAL CHANGES OR LESIONS—VITAL ORGANS THAT ARE MOST AFFECTED IN STRUCTURE AND FUNCTION.—The post mortem inspections showed that the liver, the spleen and the kidneys, the organs which are chiefly concerned in the preservation of the blood from destructive agencies, were the most constantly and seriously affected. No exception was found to the rule that the liver and spleen exhibit morbid conditions and are to be regarded as characteristic evidences of the disease; and the morbid alterations in the kidneys seemed to be incidental to an essentially pathological condition of the blood. But, as regards the pathological conditions which have been found so constantly as to be justly regarded as attributes of the disease, there were two elements which may not have depended directly upon any primary morbid alteration in the blood; yet it was plain that all these alterations should be considered as associated results of some primary

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morbid poison, that so far as we could judge by the evidence, operated chiefly upon the blood and the liver in the earliest period of its fatal work. Reasons for this conclusion will appear as we proceed in the pathological records, where the intimate changes that occur in these organs, will be fully described.

Gastric Lesions.—The only constant or characteristic lesion of tissues in any portion of the stomachs in the infected cattle was limited to the fourth stomach (*rennet or abomasum*), and this lesion consisted in erosions, sloughs and ulcerations of the mucous lining. These were, in all acute and recent cases, mostly limited to the tubular or pyloric portion of that stomach. Their appearance is correctly shown in plates 6, 7 and 13.

The folding and expanded, or omasal portion of the abomasum, though excessively congested and almost purple in appearance in certain cases of the disease, was found sloughed or marked extensively by ulcerations, only in chronic or slowly convalescing cases. Plates 3 and 4 show the appearance presented by the cases last mentioned; while plate 4 shows the appearance of the abomasum and omasum in one of Mr. Thomas' Indiana herd, which was slaughtered and sketched in the field August 13th, near Hudson City, N. J. It is almost the only instance in which the entire lining membrane of the rennet or fourth stomach was wholly unbroken by erosions or sloughs; yet the bullock was in a dying condition when killed. It would appear quite probable that the lesions in the fourth stomach result primarily from intense engorgement and stasis in the vascular structure of that stomach, and that this lesion occurs in the dense fibrous structure of the tubular section, where the sloughing and erosion of mucous membrane have been chiefly observed. Though the constricted or closely adherent relations of the membrane throughout the tubular or "reed" portion of the abomasum may justly be deemed a sufficient reason for its having become the seat of the only characteristic lesion in the stomachs, the normal constriction of the part rendering this mode of sloughing or breaking down of mucous membrane, when engorged with disorganized blood, a natural and certain consequence, yet it was deemed important to search diligently in that and other portions of the gastro-intestinal lining, to discover if any parasitic or fungus organism might chance to be associated with such a peculiar kind of lesion of the membrane. None was found. But, to the pathological anatomist the causes of this lesion cannot appear doubtful, particularly when it has most extensively appeared in those cases

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in which the structures and functions of the spleen (as the grand *diverticulum* for the excess of blood flowing to the stomach), are considered. This class of lesions in the *fourth stomach* was so constant (though greatly varied in amount) in the whole membrane of infected bullocks examined by the Board's officers, that when properly discriminated from the lesions produced by ordinary gastritis, that, as Assistant Commissioner Morris has justly remarked, "the ulcerations, or, rather, the peculiarities that were found in the tubular portion of the rennet or fourth stomach, and at the base of the longitudinal folds in that stomach, finally appeared to be a surer guide to a recognition of the disease than was the mere appearance and size of the spleen or the liver; the absolute tests by the minute examination of the liver, bile and spleen-pulp by the microscopist, and the historical and symptomatic history of the animal before death, being, of course, preferred to all other kinds of evidence. Yet to the practiced eye, these ulcerations, sloughs and erosions served as trustworthy guides in deciding the nature of any case in which for the moment, the other kinds of evidence were not accessible."

The plates which are given in this report, to illustrate the gastric lesions, present a fair average of them, both in regard to extent and morbid coloration, etc.

Intestinal Canal.—The lesions found in the intestinal canal were regarded as being important only as illustrating: 1st. The existence of passive engorgement in the mucous membrane at various sections, principally in the cœcal portion (plate 9, fig. 1), and in the rectum (plate 14, and plate 8, fig. 2). The mere congestion which was always found in various portions of the small intestine, seemed to be wholly unimportant, except so far as it showed very happily the nature and universality of the capillary engorgement that occurred in the acute or last stage of the disease. Plates 14 and 15 illustrate this condition of the intestinal mucous membrane.

Constipation seemed to be the usual condition of the bowels during a number of days preceding death, in the infected cattle. The intense and deep engorgement of the rectum and the peri-rectal tissues in the sick animals, was a very noticeable fact. So, also, was the presence of bile in the intestinal tract in most cases, even in those that were great sufferers from constipation. The question will naturally be asked, but we cannot answer: "Why was there constipation when an ample quantity of bile was found in the intestinal canal?" But this fact may here be stated, viz:

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that in feeding rabbits and mice upon breads and salads saturated with the bile from these infected beeves, diarrhœa was rarely produced, though such feeding, for the purpose of infecting those small animals, was in some instances continued daily for more than a week.

Condition of the Lungs and the Areolar Tissue.—The lungs were in all cases found in a healthy condition, or, at least, unaffected by the disease, except in a very small percentage of the cases in which the infected bullock had been for many hours incapable of changing his posture, when hypostatic congestion of a portion of the lungs was noticed. The question was often asked: "How is it possible that so great a degree of disintegration of the blood produces so little congestion in the lungs?" The fact is as we here state it, and until analytical chemistry had proved that the blood in the late stages of the disease is watery and thin, it certainly was difficult to comprehend the reason for what we saw. Yet the fact must be borne in mind, in regard to the type of the disease, that *it is not* an inflammatory malady, and is not characterized by fibrinous and plastic exudations in any tissue of the body. It is true, however, that in a few instances there existed a marked degree of infiltration of the areolar tissue with serum and the fluid resultants of blood dissolution; and in reference to this there is an important fact to be stated in another place. The occasional occurrence of interlobular emphysema was, in all instances, observed associated with and plainly dependent upon the extrication of putrescent gases in the capillaries and the free areolar tissue. In one instance, every portion of the dying bullock's areolar tissues was thus inflated with gases. General œdema and anasarca were occasionally observed, and copious effusions also, in the more chronic cases, in which either the period of incubation had been (as we ascertained) unusually protracted, or in which there were ineffectual and lingering efforts at convalescence. The latter class of cases possess peculiar interest, and have proved wonderfully instructive as objects of pathological and hygienic study.

Special Conditions observed in the Serous and the Mucous Membranes.—The endocardial or lining membrane of the heart was found, in certain very acute cases of the disease, to be marked by minute ecchymoses, and, in two instances, the entire endocardial surface was deeply ecchymosed. These marks of blood changes and extravasation beneath the serous linings in the heart and blood vessels, seem to be precisely similar to those often seen in cases of yellow fever.

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The pleuritic cavity rarely contained more than an ounce or two of serum, but the abdominal cavity always contained more or less, and it usually appeared to be blood-stained. Though, with the exception of two bullocks that had suffered extensive complications resulting from extravasations into the areolar tissue pertaining to the intestines and the surrounding fat, there were no traces of inflammation of the serous, or other tissues of the peritoneal cavity, there nevertheless was usually found in that cavity a quantity of bloody serum, as just stated. This varied from a quart to more than a gallon. In numerous instances it was deeply tinged with brownish-yellow, like the fat. This effused fluid possessed, in some instances, the property of spontaneous coagulation in the open air. Dr. Stiles describes some curious phenomena exhibited by the fluid, and indicating that it contained some pseudo fibrine.

The mucous membrane of the gastro-intestinal tract exhibited no chronic alterations in structure, except in the slowly convalescent or very chronically sick cattle, and in all those cases the lesions were limited to the abomasum (fourth stomach).

The softening, the erosion, sloughing, and the blackened patches* of the mucous membrane in the abomasum, in acute cases of the disease, were plainly due to the blood changes; while on the other hand, the peculiar ulcerations and cicatrices in the tubular portion of that stomach, and occasionally at the base of the folds, indicated the fact that some of the sloughs that had occurred during the disease carried away all the tissues, quite down to the muscular structure. This latter class of lesions was found mostly in such diseased animals as were making ineffectual efforts at convalescence. Plates Nos. 3 and 21 illustrates such a case. Plate No. 22 presents the appearance seen in the first convalescent ox that was sacrificed for dissection in the reserved group of five from Mr. Alexander's herd. This animal was rapidly recovering, and had not passed "black water" for six or seven days.

The morbid appearances usually observed to exist in the intestinal mucous membrane are shown in Plates 11 and 14. The deep engorgement in the mucous membrane of the rectum, as seen in Plates 11 and 21, was occasionally wanting, though usually very marked. Indeed, the blood-stained appearance of the excremental droppings

* The blackened patches and puncta, when minutely examined, were found to be simply extravasated blood, rendered black by the gastric juice, the mucous membrane at these points being softened and broken. The occasional presence of genuine "black vomit" in this stomach (the abomasum or rennet), only illustrated this pathological alteration of blood and tissue in an extravagant degree.

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was one of the means by which the presence of infected animals was occasionally detected by Dr. Morris and his yard inspectors, so almost constantly was this symptom present in the sick cattle, before an obviously morbid condition of the animal was discoverable. In only a single instance was the muscular and areolar tissue of the rectum found deeply involved in the engorgement, or in an inflammatory process; nor was the mucous membrane, color, or any other portion of the intestinal canal, found to be sloughed or ulcerated. The fourth stomach (abomasum) alone exhibited this lesion. The only instance in which this kind of destruction of mucous membrane was not observed, was in the case represented in Plate 4. This exceptional case was plainly on the verge of extensive sloughing or erosion of the lining tissues of the abomasum, for it was already deeply ecchymotic. This was a very marked case from Farmer Thomas' herd, and was killed for dissection August 13th. The sketch was made by the artist instantly upon removal of the organ from the carcass.

The mucous membrane and all appearances of the mouth, pharynx, œsophagus and nostrils were normal, with the exception of a jaundiced hue that was noticed in some cases that had continued many days. But in acute cases, as in that from which the stomach last mentioned was taken, the mouth and lips had a clear and somewhat injected appearance. This is shown in plate 8, fig. 1, together with a common accidental ulcer that chanced in this case to be present.

Post Mortem Appearances of the Brain.—In three instances the condition of the brain was carefully examined, because it was presumed that those particular cases might be found to have suffered from acute meningitis or from cerebral congestion. No trace of actual inflammation was found, but there was evidence of congestion of the cerebral vessels in two of the cases. The medulla oblongata was examined in these cases, and sufficient effusion was found in one instance to have produced morbid, nervous and muscular phenomena. Yet the observations finally led to the conclusion that all, or nearly all the delirous actions, distorted movements and postures, and the comatose conditions that characterized various cases, were attributable to the toxæmia which constitutes the essential quality of the disease.

THE PATHOLOGICAL CHANGES FOUND IN VITAL ORGANS WHICH ARE CHIEFLY CONCERNED IN DEPURATION AND CONSERVATION OF THE BLOOD.—The importance of the blood-changes was so manifest and

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all-pervading in the disease, that it was deemed necessary to search very carefully for whatever structural alterations the liver, the kidneys, and the spleen might exhibit in the various stages of the disease. The fact that the lungs presented no lesions has already been stated, and we may now refer to the three other vital organs upon which the conservation of the blood depends. And for the purposes of this report it will not be needful to encumber the record of mere observations with any statements concerning the normal structure or the functions of these organs. And in regard to the morbid histology of most minute structural changes discovered in each of these organs by means of the microscope, all the conclusions that can properly be published are presented in Dr. Stiles' report in the succeeding chapter. The statement we would here make will refer to the grouping and total quantity of results of the morbid alterations in these organs, so far as a reasonable judgment may now be expressed concerning them.

The Liver.—Increase in weight and volume was a constant fact. Taking the normal standard of weight of the liver to be from eleven to fifteen pounds avoirdupois, the average degree of augmentation in weight was found to be equal to about thirty per cent above the normal weight. The most excessive weight was found to be thirty-three pounds,—the steer being one of medium size, estimated at a gross weight of 1,200 pounds,—one of farmer Thomas' herd, killed in the moribund stage four weeks after the first exposure to the Texas infection.

The increase in the size of the liver kept pace with its increase of weight. This increase in size and weight in all cases consisted chiefly in the excessive engorgement of the portal blood vessels, but in the cases that had been long in progress there was such a degree of fatty and "waxy" degeneration as to add largely to the weight and still more largely to the volume of the organ. This was the case with the liver exhibited in Plate 17, which weighed upwards of twenty-three pounds, and was taken from a young bullock that was slaughtered in the moribund stage of the disease, and after a long continuance of it, the entire period being probably not less than forty-five days. The shape of the liver was in some instances, as in this one, distorted by rapid increase in its size. There were some instances in which a waxy condition of the liver was unattended by engorgement with blood, but in no instance was the liver found in the very "dry" condition that occurs in long protracted fatal cases of yellow fever in man, though in several instances that con-

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dition was in some degree established. The later observations in autumn clearly indicated that the "waxy"* change occurred in the animals that suffered long with the disease. This was most strikingly illustrated in the ox that was killed for dissection the 18th of October, and some of whose morbid conditions are strikingly represented in the several figures in Plate 23. This liver weighed eighteen and a half pounds, and strongly resembled the "dry" condition in persons that die after twelve or fifteen days' suffering from yellow fever.†

Before concluding these statements concerning the obvious and essential alterations found in the liver in this disease, it is necessary that we should remark that no special importance is attached to the ordinary and familiar modes of observation and description. The color and consistence of the liver were not in all cases so *obviously* changed as to attract special notice. The morbid condition of the bile, and especially, a certain quality it displayed when tested upon blood-globules,—dissolving them almost instantly, as described in the next chapter by Dr. Stiles,—rendered it very desirable to have scrutinizing examinations made in regard to the intimate or integral changes that might be found in the minute organization and structure of the liver. The pathological alterations in an organ so elaborately organized and structurally guarded as the largest and most constantly active of all the secreting organs of the animal system,—the liver,—may suffer grave and dangerously injurious pathological changes both in structure and function, and still retain a fair appearance upon its surface. And as regards the discoveries that Dr. Stiles has made in his researches into the morbid alterations in the liver, and incidentally, into one of the most important elements in its pathological structure, namely, the ultimate distribution or reticular structure of the biliary duct system, it plainly appears that no ordinary observations could ever have reached such definite results, or have added such welcome and very necessary facts for guides to the proper interpretation of the nature and consequences of the malady we are here considering; and important, too, for the more exact understanding of certain most destructive human pestilences.

The morbid and morphological changes and abnormal elements

* As described by the histologists, or under microscopical observation, this alteration in structure consists in a thickening of the *walls* of the secreting *cells* of the liver.

† The chief pathological changes in this disease of cattle promise to throw so much light upon those of yellow fever that we deem it proper to call attention to such points of resemblance wherever there is an essential and characteristic alteration of structure, &c.

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discovered at the outset in the bile of the diseased cattle, served both as a guide and an incentive to patient researches and experimental tests. The next chapter will sufficiently explain the nature of this interesting line of investigations. But let it be remembered that the first fact that was demonstrated or asserted concerning the source or carrier and vehicle of the contagious cause was this, namely, that the excrement of certain Texas cattle is directly chargeable with this unfortunate evil. Hence we came to regard with interest whatever abnormal elements or properties the bile of the diseased cattle possessed, because it is a ready vehicle for carrying into the excremental droppings whatever may pertain to it. The experimental investigations in regard to the fungus organisms found in this morbid bile are still in progress. In this branch of inquiry we invited and obtained the coöperation of Prof. Ernst Hallier, of Jena. That gentleman is justly regarded as the highest living authority in experimental and analytical researches of this sort in the study and cultivation of the microscopical organisms that infest plants and animals. Prof. Hallier's plan of inquiry in regard to the spore organisms that are found in the blood and bile of the sick cattle will be found in a subsequent section of this report. Though this particularly abstruse line of inquiry has been only collateral to the first objects that were to be kept in view in the work, and though the actual relations of the fungus-spores in the blood and bile may not be fully grasped in the present—merely preliminary stage of inquiry—and may not throw any light upon either the source or the essential nature of the disease, at least until naturalists shall have advanced many steps further in the study and analysis of the parasitical fungi, the demands of progressive knowledge require that whatever facts have been acquired in regard to this collateral, and, probably very essential line of studies, should not be timidly withheld from publication. Therefore the committee has advised that the record of this class of observations should be embodied in this report. And as this parasitical element of the morbid bile has become an object of special examination, we refer to it now as one of the constant elements found in the bile of the infected cattle.

The Spleen.—The most *obvious* of all the morbid appearances exhibited upon the mere exposure of the abdominal viscera to external inspection is that which the spleen presents in most cases of the disease. The morbid changes that occur in the essential and intimate structure of this organ seem to be equally as constant as

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those which occur in the liver, but, considering the comparatively subordinate functions that are required of the spleen,—so far as its functions are understood—its pathological changes cannot reasonably be regarded as being so important and far-reaching in their influence, as attributes of the disease, as the structural and morphological changes in the liver seem to be. But as the grand diverticulum or waste-gates to the portal and gastric circulation, the spleen would inevitaby become engorged and swollen to abnormal dimensions so soon as engórgements and obstructions in the circulation of blood in the liver, or the liver and the rennet stomach occurred. This is an accepted deduction in physiology, and requires no further remark in this place.

Yet it is not certain that the mechanical and anatomical disturbance which the disease produces in the spleen does not finally induce morbid conditions in it, or, as seems probable, so cripple and overwhelm its special, but obscurely known functions, that the total suspension of those functions may contribute towards the rapid and fatal dissolution of the blood itself. The fact that the spleen is generally believed by physiologists to be charged with some special duty towards the repair of the blood corpuscles, or at least, the duty of completing the normal dissolution of the defective and worn red corpuscles,* gives peculiar interests to the pathological inquiries concerning the share the spleen has in this disease. Dr. Stiles has carefully described the degenerative and other structural changes which the microscope revealed in the cases which he examined. The very constant presence of crystals of hæmatoidine in the enlarged cells of the spleen, together with the peculiar yellow flocculi, such as were found abundantly in the blood and the bile of every infected bullock must be regarded as important circumstances.

* The difficulty hitherto experienced in all efforts to demonstrate the nature and functions of the spleen and the thymus gland, need not prevent us from adopting the conclusion that notwithstanding the morbid alterations in the structure and functions of the spleen may be secondary to those in the blood and the liver, they nevertheless can contribute important results towards the final fatal end. As that philosophical writer, Dr. John Simon, has said of the thymus gland that "it seems to serve the purpose of a sinking fund in the interest of respiration," so it may be said of the spleen, that it serves as a sort of "sinking fund" in the interest of the worn and expiring red blood-globules, and of a sound state of the circulating blood. And continuing the figure it may reasonably be presumed that the destruction of the "fund" may, in the critical exigencies of disease, contribute to the general disaster which the blood and life itself must suffer. At any rate this illustration aptly conveys, in a homely way, a correct idea. We would invite attention to the results attained by Dr. Stiles in his study of the changes,—both morbid and conservative,—that occur in the spleen in this disease.

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Theories regarding the relation of the spleen changes to the disease or to its fatal termination; are of minor consequence, for physiologists and pathologists will not hesitate to agree with Dr. Stiles in the very reasonable opinion, that all the essential changes in this organ of the infected animals are of a secondary character. The diseased conditions which were uniformly found in the liver and in the fourth stomach, would inevitably be attended by engorgement of the spleen.

There were four or five instances in which cattle were found dead with this disease in the Metropolitan market yards, or abandoned by the wayside, and dissected at the rendering dock, in which the spleen was said to be found ruptured. The fact is, that in every such case, this organ was also found in a state of total disintegration, a mass of diffluent pulp. Descriptions which have been forwarded to this committee of post mortem appearances of the spleen and other viscera found in diseased cattle in various places in the Western States, show that the instances are not infrequent in which the spleen is found in the condition here described, particularly if the infected animal lingered to die in the natural way. The sanitary authorities of Chicago, Illinois,—having ascertained through Dr. John H. Rauch, their intelligent sanitary superintendent and registrar, that an increased weight and volume of the spleen were the most readily observed facts to which they could officially direct the attention of butchers and meat inspectors, at the immense slaughter-pens of that city, where Texan and Western beeves are killed for packing as well as for the city stalls,—ordered that all spleens should be carefully and separately weighed, and that excessive enlargement and disorganization of this organ should be regarded as sufficient evidence for the condemnation of particular cattle and herds, so as to prevent sale and slaughter. Though an engorgement and very great enlargement of the spleen may occur from various other causes than the Texas cattle infection, this test which was adopted by Dr. Rauch for convenience sake, and fully approved by Prof. Gamgee, undoubtedly served the practical purpose of the sanitary authorities of Chicago exceedingly well.

Dr. Rauch has politely furnished us a transcript of the entire record of the weights of spleens and livers that were inspected under his authority at the Chicago slaughter-pens. The record of the native cattle (Illinois and Missouri stock) shows that 4,918 were killed, and that the average weight of their spleens was 1.35 pounds each; while the record of the freshly arrived Texas cattle shows

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that 3,485 were slaughtered, and that the average weight of their spleens was 2.28 pounds. The details of these records show that the spleen in native bullocks rarely exceeded one and a half pounds, excepting in the case of those that were suffering from Texas cattle disease; also, that in the Texan cattle recently arrived there were particular herds in which nearly one-half of the bullocks had this organ so greatly enlarged that it weighed between two and a half and four pounds, or an average of nearly three pounds.

The wood cut, No. 1, on the preceding page, is sketched from a photograph presented to us by Dr. Rauch, of a group of healthy and unhealthy spleens. In the second sketch is shown a group, selected by Sanitary Inspector Dr. Janes, at one of our city slaughtering houses, the small and natural specimens being from native or State cattle, the enlarged ones being from infected Texas steers freshly arrived from Texas, by way of Illinois.

The term "spleenic fever," which has been applied to this disease, and the term "milzbrand" that is applied to a group of anthracic fevers in Central Europe, do not convey any correct idea of the essential nature of the diseases to which they are applied, though they thus prominently mention an organ which, from peculiarities in its anatomical construction, readily takes on certain very obvious morbid appearances.*

*The familiar and expressive terms in which some of the best medical observers of the Texas cattle disease in Missouri and Kansas have described the symptoms, and the pathological changes produced by it, serve to convey some important facts which will explain various apparent discrepancies that have appeared in the descriptions of post mortem appearances. The fact that the sanitary officers could make no scientific use of the putrescent mass of viscera, which was almost invariably found upon opening an infected animal that had been dead more than an hour or two, will explain, also, how different are most of the descriptions of their post mortem dissections from those published elsewhere. For an illustration of the first-rate descriptions which have been given by some Western observers, who have been many years familiar with the disease, we quote the following extract from a report of Dr. Albert Badger, Nevada city, Vernon county, Missouri. Concerning post mortem appearances, he says:

"In a very close observation of this disease among my own and neighbors' stock for the last thirteen years, I have generally found on opening those that had died but very little blood, and the following results: In those that passed water, mixed with blood, the kidneys and surrounding parts were entirely decayed, the other parts of the body sound; those that did not dung at all, or but very little, with manifolds perfectly dry and partly decayed, while the large stomach would be more or less mortified, other parts healthy; those that appeared to dung and pass water naturally, with a liver more or less decayed, the gall bladder always swelled to its greatest tension, other parts healthy; those that were ever on their feet in a watchful attitude, the brain was found more or less decayed. This leads me to believe the disease to be in the blood, which finally becomes congestive, destroying the parts in a fews hours after it becomes seated, and no doubt in many cases could be cured if we knew exactly when and where it had seated itself—blood-letting not being sufficient of itself to check the inflammation. The hollow horn and tail no doubt is caused by the fever destroying the blood in the extremities before it does in the vessels, which it does destroy in a great measure before death."

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It would be difficult to find, in the whole category of human diseases, so striking an illustration of the disintegration and ultimate destruction of the blood, associated with so extensive and so rapidly-produced fatty degenerations of tissue in the liver, spleen and kidneys. Yellow fever and malignant congestive (intermittent) fever are respectively attended by some of these changes; but we have witnessed no disease previously, in man or the lower animals, that has afforded such an opportunity for *demonstrating* the mode and the various results of blood-poisoning. The wasted, crippled and shrunken red globules; the transudations and ecchymoses resulting from this drainage of the vital fluid; the injurious and obstructive presence of resultants of this damaged blood in the tissues of the liver; the overwhelming of the spleen by the *debris* of the *spoiled* blood; the views which the microscope revealed of the condition of this *debris* and of the spleenic tissues in the fatal stages of the disease, and during successful convalescence; and, lastly, in cases that lingered beyond the acute stage, the presence of crystalized *hæmatoidine*—that beautiful signet and memorial of the destroyed blood-globules and consequent transudations—in all loose tissues and the chief secernant viscera of the body, presented, together and in their various relations, the most remarkable, the most instructive, and, when studied with all the associated facts, the most conclusive results that could be met with in the physician's searches into the nature and consequences of a pestilential disease.

It would be impossible, in a mere report of events and particular results in the committee's investigations, to place all of the more interesting and conclusive circumstances on record concerning particular observations in individual cases of the infected cattle. Each case, when carefully dissected and studied, presented striking "memorial tracings" of the morbid changes that had occurrd in the blood. For example: An infected bullock was killed for dissection, October 18th, at the National drove yards on Third and Fourth avenues. [This bullock's jaundiced skin, waxy and fatty liver, and partially restored spleen, are represented in Plate 23.] The fat surrounding the kidneys, and, to some extent, that of the omentum, was of a greenish and mottled appearance, and the cellular tissue contained some opaque serous fluid. The dissector cut the discolored fat with caution, saying there must be pus in it. But it was simply a mass of hæmatoidine crystals, which remained there as a signet left by the disintegrated red globules of the spoiled

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blood. In other cases, both lingering and acute, brilliant and discolored spots in pelvis of the kidney were found by Dr. Stiles to consist of hæmatoidine. Besides this beautiful seal, which the disease impressed upon the glandular and cellular tissues, there always could be traced other series of proofs of the nature and results of the blood changes.

[Dr. Wm. Aitkin, in his remarkably instructive chapter upon "Symptoms and Signs of Disease," happily epitomizes the facts relating to the source and significance of hæmatoidine crystals found in the tissues and closed cavities of the body, in the following remark: "Crystals of hæmatoidine are the most frequent products of blood-degeneration (Virchow). They are formed spontaneously out of hæmatine. * * * If large masses of extravasated blood continue to lie for any length of time, this is the substance into which the blood is transformed. An apoplectic clot in the brain, for example, is repaired by a large portion of the blood (the clot) undergoing this transformation, and the color of the resulting cicatrix is due to the crystals of hæmatoidine. When a young woman menstruates, also, the cavity of the Graëfian vesicle, from which the ovum escaped, becomes filled with coagulated blood, and ultimately hæmatoidine crystals are the last memorials of the event (Virchow)."]

The Kidneys—Dr. Stiles submitted specimens of this organ to microscopical examination from all the cases of which he also had opportunity to examine the liver and spleen. The changes in structure are in harmony with those found in the latter organs and in the blood. The kidneys indeed, contained certain very important evidences and signets of the rapid destruction which the red blood-globules had undergone. Nothing could be more significant than the lodgment of crystals of hæmatoidine in the tissues of this depurative gland. The average general appearance of the kidneys in the infected bullocks which we slaughtered and dissected for purposes of scientific investigations, is correctly shown in the plate on the next page. This specimen (Plate 19) and its mate (Plate 20, fig. 1) on the page following, were taken from a young bullock slaughtered at the National drove yards, One Hundredth street, September 26th. The two weighed five pounds eleven ounces. The appearance of the kidney during convalesence, at the end of seven or eight days in progress of recovery, is represented in Plate 20, fig. 2. This specimen was taken from the first convalescent of Mr. Alexander's herd, August 16th.

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In many instances the morbid appearance was less marked than in the examples here represented; but in still more cases there was vastly more alteration in appearance, and with scarcely an exception as is reported by all observers, there is usually a more morbid appearance of the kidneys than that which is here exhibited. But it is not in the mere appearance, but in certain morbid changes which the microscope alone can reveal, that this organ has aided the general inquiry concerning this disease. Often, in the post mortem inspections of cattle found dead, and in slaughtered and allowed to remain a few hours, the kidneys were found utterly disorganized and almost as diffluent or broken down as the spleen in the same animals. A marvelous rapidity of disorganization and putrefaction of this and every other organ that was similarly engorged with blood, will be remembered by all observers as a decided characteristic. But it is a fact to be noted that the kidneys as well as the liver, kept up a remarkable activity of secretion, or at least of evacuation of morbid secretions, until a very late stage of the disease. The source and nature of the "black water," or hæmaturia are correctly illustrated in Dr. Stiles' report [Plate 7], and in the chemical analyses of urine and blood, by Professor Chandler. The loss of blood-albumen by the kidneys in this disease is in all cases enormous, and the blood analysis shows that this loss goes on *pari passu* with the disease, so that in long protracted cases it reaches a minimum percentage of the quantitative results in the table of analysis.*

The report of Dr. Stiles which follows in the next chapter, adequately sets forth the results of microscopical examination of the three vascular organs that we have mentioned in this section, as being the chief objects of interest in those pathological researches. All other organs and tissues of the body were in turn examined, but it was in these three organs, the most vascular, the most susceptible to morbid alterations in their organic and interstitial constitution, while, also, the respective functions which they severally perform in preparing the blood for its continued flowing as the healthful supporter of life, that distinctly and very peculiarly characterized alterations in structure, most important, far-reaching and fatal in results in the infected cattle were observed. But this

* The decrease in the percentage of albumen in the blood manifestly depends upon three causes, viz., loss by waste through the kidneys; loss by the destructive effect of the fever in which this blood of food has to meet unusual demands; and lastly, the failure of the sick animal to supply by its digestion of daily food.

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statement must here be repeated, that it is not in the fortuitous changes of color, size and apparent healthfulness of these organs that the question of their healthful or their diseased condition is determined in an acute malady like this of the Texas cattle disease.

Devoted to special and vitally important functions of blood preservation, each of them containing characteristic marks of morbid conditions induced by the poison of the disease, and each in its own peculiar way, finally becoming embarrassed in function and organic structure, these organs were the subject of daily study by Dr. Stiles and various medical observers for more than three months. The results of that study have been worthy of the labor bestowed, for very important facts have been ascertained which throw light upon the nature and course of the disease that was under investigation, and at the same time contribute to the progress of important branches of medical knowledge.

NOTE ON SPECIAL CONDITIONS OBSERVED IN CONVALESCENT CATTLE THAT WERE SLAUGHTERED FOR DISSECTION.—In the report by Dr. Morris will be found an abstract of notes taken at the post mortem examination of the five convalescent cattle belonging to Mr. J. T. Alexander's herd. They will repay perusal. Much might be added to these notes that would be interesting to pathologists, and also would be important to farmers and herdmen that may have to deal with the disease. We will briefly recapitulate the most essential facts observed in the examination of animals known to be convalescent from the disease:

1st. *External Appearances.*—For several days the eyes appear jaundiced, the skin also, in certain cases, was seen to be deeply jaundiced; and this is strikingly shown in the case of a bullock that was slaughtered on the 18th of October, after being at least ten days past the commencement of obvious symptoms. The appearance of this animal is correctly shown in Plate 23, fig. 1. The cases examined late in the autumn, like the one here mentioned, had œdematous legs, and exhibited a very flabby condition of surface.

2d. *The Temperature.*—Examined per rectum, the first of Mr. Alexander's convalescents (slaughtered August 16th) on the seventh day after last of the hæmaturia, gave a temperature of 103½° Fah. The other members of that convalescent family, which came to their dissection for scientific purposes on the 26th of August, from twelve to sixteen days past obviously acute symptoms, gave the following temperatures: No. 1, 103°; No. 2, 103½°; No. 3, 103½°; No. 4, 103½°. In other instances of cattle partially recovered from the

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disease, there usually was some complicating condition that kept up the febrile temperature, as in the bullock whose jaundiced skin is illustrated on the preceding page. His temperature, when ten days or a fortnight past the obviously acute stage, but when suffering intensely from inflammation of the rectum and colon, and from the extravasation of his anæmic blood into the cellular (areolar) tissues of the body, was 105¼°. In several of the imperfectly recovered Texas cattle, examined by Sanitary Inspector Janes at one of the butcheries—cases quoted by Dr. Morris in this report—the temperature was two degrees or more above the standard of health.

3d. *Condition of the Blood.*—In all the convalescents it was remarkably deficient in red globules and globuline, and in the percentage of salts, of albumen, and of total solids. This is shown in the chemical analysis of the blood of diseased bullocks by Prof. Chandler. [See his Tabulated Analyses.] The same fact was confirmed in the microscopical examinations by Dr. Stiles, in regard to the destruction of the red globules.

4th. *The Spleen and Liver.*—In every convalescent these organs exhibited evident traces of the disease. The weight and the unnatural appearance of the spleen seemed to be very tardy in the return to normal conditions. The spleen of the first examined convalescent in Mr. Alexander's herd (on the seventh day) weighed five and a half pounds, and was still soft and discolored; while the liver weighed thirteen and a half pounds, and was fatty and fawn colored. In convalescents killed later in the season, the "waxy" conditions were conjoined, and the former was evidently supervening upon the latter condition. In Plate 23 a section of such a liver is shown, also a section of the spleen. They evince a tardy return towards the healthy state.

5th. *The Abomasum or Fourth Stomach.*—A rapid tendency to recovery from the common erosions and ecchymotic conditions in the tubular or "reed" portion of this stomach was evinced in the well conditioned convalescents; but the deep sloughs and ragged ulcerations recovered slowly. Plate 21 exhibits the appearance of the tubular or "reed" portion of the abomasum in the first bullock killed in Mr. Alexander's group of convalescents, at Communipaw.

6th. *The Bile, the Blood,* and the vascular organs concerned in blood elaboration, continued to exhibit the yellow flocculi or pigment matter and the hæmatoidine crystals for some time. But the fungus spores ceased to be found quite early. The completeness

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and rapidity of this disappearance of the fungus parasite in the cattle that were medicated with carbolic acid was, at the time, a subject of unexpected satisfaction. It was reasonably presumed to be due to the action of the carbolic antiseptic upon the blood.

EXPERIMENTS TO TEST THE SUPPOSED METHODS BY WHICH THE DISEASE MAY BE COMMUNICATED.

In the beginning of our inquiries the fact became so unequivocally established that to the excrement of the cattle which introduced the disease was to be attributed the means or vehicle of distribution and propagation of the infectious cause of it, that it was believed there would be a spontaneous demonstration of the possibility or the impossibility of the re-propagation of the poison by Northern cattle which were under observation and dying with the disease in the vicinity of New York. The only instances of such re-propagation by sick native stock are related by Assistant Commissioners Drs. Morris and Montfort concerning the herds in Orange county.

Dr. Stiles attempted some experiments by injecting a solution of infected bile into the blood vessels of some of the lower animals, but they gave no other result than that of a speedy termination in fatal convulsions, as soon as the solution mingled in the general circulation.

The constant presence of the fungus-spores in the bile of the infected and dying cattle suggested the propriety of instituting a series of experiments and tests upon such herbiverous and carniverous animals as could readily be made to partake of simple foods garnished with a little of the morbid bile. To Dr. F. J. Randall an Assistant Sanitary officer, the task of conducting the experiments was committed. Dr. Stiles followed up the examination of the morbid anatomy and microscopy of the fluids and diseased tissues whenever death ended the experiments upon any of these small animals.

The experiment on dogs was inconclusive. Dr. Mackay, the Health officer of Buffalo, had informed us that all his observations in feeding dogs with the flesh of the infected dead cattle ended in poor Tray's vomiting the food. Three dogs were kenneled and fed very sparingly on two of the enormous livers taken from infected cattle that were slaughtered for dissection. Two of them were attacked with an obstinate diarrhœa and one of them died at the end of twelve days. The stomach of the latter was ulcerated, but Dr. Stiles discovered no traces of the essential signs of the cattle

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disease. It was scarcely presumed that the dog would readily succumb to the poison if any pertained to the tissues of the liver and the bile they contained.

The facts regarding the pathological results of this feeding and incubation of the bile-poison, if poison it was, are summed up by Dr. Stiles in the second part of his report. He found all the characteristic lesions which the infection induces, and he remarks that the rabbits "died with many of the phenomena of the Texas cattle disease." Dr. Randall states that they died suddenly in every instance, after but a brief period of apparent illness. The only fungus-spores discovered in the dead rabbits were those known to mycologists as the *Cryptococcus guttulatus*. Regarding the practical inference to be drawn from these experiments we would not consider them absolutely conclusive, because the absorption of *morbid bile* into the blood would in all probability produce the chief results that were observed by Dr. Stiles and Dr. Randall. Yet, so far as this series of results has any bearing upon the theory of this fever-propagation, by means of this germ-element, they are regarded by Dr. Stiles as strongly confirmatory.

Experimental tests showing the effects that would be produced by the transfusion of blood from an infected bullock into a healthy one was scarcely practicable, as every medical observer was already overworked, and no pecuniary means were available for such experimentation. That class of tests remains to be made, together with several other experimental observations if the infection ever again crosses the Mississippi river.

INDISPENSABLE USES OF THE MICROSCOPE AND CHEMICAL ANALYSIS IN THE INVESTIGATION.—RESULTS.

The microscope and the chemist's laboratory are helps to the student of the causes and effects of disease, but they may as readily prove false guides as true, unless they are themselves directed by skillful and thoroughly experienced hands. The success that attended the labors of Dr. Stiles and Prof. Chandler, in their respective branches of investigation, will justly be regarded as among the most satisfactory results attained in the whole range of inquiry. The reports of those two co-laborers follow in next chapters. Divested of the technicalities of such studies, their results may be concisely translated into familiar phraseology, as follows:

What the Microscope has revealed concerning the Pathological Characteristics of the Cattle Disease.—(1.) That the red corpuscles

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of the infected blood are impaired, and, to a great extent, broken up before the death of the infected animal; and that, immediately after death, the disintegration of this essential and life-bearing constituent of the blood, as well as the other constituents, went on with amazing rapidity.

(2.) The chief change discovered in the liver, spleen and kidneys, consisted in the acute fatty degeneration or deposit, and in certain remarkable evidences of embarrassment in the circulation of the blood and of *destructive changes in it.* The presence of the crystals of hæmatoidine, and of a peculiar yellow matter, in these organs and in the bile, as well as in loose cellular tissue, were so remarkably demonstrated under the microscope, that they came to be regarded as *signets* of the presence and operation of the disease upon the red blood-corpuscles. The yellow matter here mentioned also associated destruction of the red corpuscles with the presence of the morbid bile; and this circumstance, in the pathological condition of the blood, was rendered quite certain by other kinds of evidence.

(3.) The diseased *distension* of the minutest biliary ducts by the morbid bile, revealed a physiological fact regarding the minutest and previously undetermined character of the ultimate arrangement of those ducts and their relations to the secreting cells of the liver. This discovery by Dr. Stiles has served to aid in the investigations and deductions.

(4.) The exact nature and causes of the "black water" or hæmaturia have been clearly defined by the microscope.

(5.) The nature of the morbid changes which occur in the spleen in consequence of the disease is clearly defined, so far as the microscope can reveal the altered conditions in that organ.

(6.) The presence of fungus-spores or an infinite growth of parasitical organisms, has been revealed as a constant fact in the blood and bile of the infected animals. And to test and develop, by experimental culture, the actual nature and botanical (mycological) classification of this fungus parasite, has been a separate undertaking. Furthermore, without waiting the results of such culture, the microscopical observations upon the bile, the minute tissues of the liver, and the morbid conditions of the blood, &c., are finally regarded as warranting the conclusion, that whether it may be an active and propagating element in the infectious cause of the disease, or only a concomitant of the diseased and feverish blood in the infected animals, it certainly seems to play an important

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and fatal part in the final morbid changes that occur in the bile, if the bile becomes, as there is no doubt it does at last, a destructive poison to the blood and the nervous centres.

(7.) The microscope has enabled Dr. Stiles, and Prof. Hallier (of the University of Jena), to trace the botanical and developmental history of the fungus element or "micrococcus."

In these, and in various other ways the pathological investigation of the disease has been aided by the microscope in the hands of a most learned, careful and trustworthy physiologist and pathologist.

RESULTS FROM CHEMICAL ANALYSIS.

The Blood.—In the eight columns that present the results of the quantitative analysis of blood from fourteen infected bullocks that were slaughtered and carefully dissected for the purposes of our investigations, Prof. Chandler has clearly demonstrated the following facts:

(1.) The normal relative proportions of the total solid constituents, and the water of the blood in the infected cattle, was found to be changed, the healthful percentage of solids being much diminished, and in the most typical cases of the disease this decrease of solid constituents was excessive. In a fine fat steer that had passed the acute or explosive symptoms, and was (ineffectually) convalescent, this decrease of solids in the blood was found to be equal to fifty parts in the 1,000 of blood, or of the one hundred and ninety of normal solids, that is, this loss *exceeded twenty-five per centum* of the natural total of solid flesh-forming constituents in the blood. In other instances in which the disease produced extreme symptoms in very fine and full fleshed animals, as in one that was carried to the rendering dock, and in two that were killed and carefully dissected September 11th and October 18th, respectively, the loss of solid elements of the blood was found to be nearly seventy parts out of the normal proportion (which is about one hundred and ninety) in the 1,000 parts of blood, or equal to thirty-seven per centum of loss of the substance of the blood. But the loss of solid elements was not an invariable fact, though evidently quite sure to occur in extreme cases, and in all instances of lingering beyond a few days after the period of hæmaturia and the acute symptoms.

(2.) In every case of the disease there was *a very marked loss of red blood-corpuscles.* The loss amounted to more than fifty per cent of the total quantity that healthy bullocks' blood contains; and, in the most striking cases, the loss of blood corpuscles and

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globuline was almost complete. In some examples (one of which Prof. Chandler has placed in his tabulated results) the destruction of this most essential element of the blood could not be estimated, so entire was the destruction and change.

(3.) The healthful proportion of salts in the blood was diminished in all the typical cases that had survived a few days after the onset of acute symptoms. The causes of this loss, as well as that of total solids were physiologically obvious in the class of animals in which it occurred.

(4.) Albumen was quite constantly found below the healthful proportion in most of the cases examined, but it was noticed as in excess of the normal amount in those cases of the disease in which the blood-corpuscles and globuline had undergone such changes as caused the red globule element to nearly or wholly disappear from the list of proximate elements.

(5.) The fibrin varied greatly in amount, but in the phenomena of coagulation, &c., never exhibited signs of an inflammatory condition. In some instances the fibrin appeared rotten and imperfectly elaborated; but in no specimen examined under the microscope did Dr. Stiles notice any unnatural state of fibrillation.

The foregoing five points of departure from the healthful standard of the blood elements are thus specially noticed, because they are very directly associated with the essential cause and course of disease.

The Dropsical Effusions (Serum) in the Peritoneal Cavity of the Infected Cattle.—The effused dropsical fluid possessed the property of spontaneous coagulation when exposed to the air. Dr. Stiles' description of the peculiar mode of that coagulation shows that a pseudo fibrin was contained in these fluids. Prof. Chandler's analyses show that this fibrin was quantitatively estimated. In the remarkable case that was examined the 9th of September, the spleen was ruptured, accidentally, as we believed at the time, in last struggles, or in the handling of the bullock. [See third analysis of serum and eighth analysis of blood, in Prof. Chandler's tabulations.]

Chemical Analysis of the Bile.—The results are recorded without comment. There may be readers of this report who would ask for these results, and the time may come when this class of facts will aid in other inquiries.

The Urine.—The albuminous state of the urine was in all cases remarked, and in most instances this wasting of the substance of

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blood by the urinary organs was excessive. The morbid changes that were occurring in the blood itself—by damage to the red globules and to the fibrin—would account for this wasting, even if the kidneys had not been found to be undergoing acute degenerative changes, and suffering enormous congestion. And it is worthy of notice that the congestion of the kidneys (usually excessive, but in some cases unnoticeable,) did not result in obstruction and suppression of urine, but usually in an excessive flow of it.

Chemical Analysis of the Liver.—It was not until cold weather arrived that any analysis of this organ was attempted. The specimens were not as excessively fatty as livers dissected earlier in the season. They were changing into what is termed the "waxy" condition, in which the minute cell-walls are simply thickened by plastic matter, and, as before remarked, there was far less fatty deposit than in the livers that were not "waxy." Dr. Stiles states that the microscopical examination of the livers thus analyzed, contained less than half the proportion of free fat than those that were examined earlier in the season and in the acute cases. But even the four examples presented in Prof. Chandler's analyses, show an excessive percentage of fat. Here we see no less than sixty-two and a half, sixty-six, eighty-eight and a half and ninety parts, by weight, of fat in 1,000 parts of the liver substance, in livers that had, in the lingering stages of the disease, changed to the "waxy" condition. Frerich found only twenty-two parts of fat to 1,000 of substance in a waxy liver, and one hundred and seventy-two parts in a fatal case of "fatty liver."

In pursuing a pathological inquiry upon yellow fever in man, the writer submitted a specimen of a liver from a sea captain that died of that disease, to Prof. Chandler for analysis. The man had died on about the twentieth day from the beginning of incubation of the disease at the port (Vera Cruz) whence he sailed. The liver was the most perfect specimen of the *café au lait* or dry and fawn colored condition of that organ as witnessed in lingering cases of that malady. The following is the result of the analysis: Water, 739.84; total solids, 260.16; fat, 96.31.

Dr. Stiles' microscopical analysis of a specimen of the same human liver, pronounced it a typical example of yellow fever liver, as had also the writer's professional examination of the body and history of the patient the previous day enabled him to do. It seems desirable to place these facts on record here, though they relate to a pestilence in the human family.

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EXPERIMENTS AND TESTS FOR THE VERIFICATION AND SETTLEMENT OF QUESTIONS THAT HAVE ARISEN IN THE COURSE OF THE INVESTIGATIONS.—The chief experiments of this kind relate to the attempts to cultivate the fungus spores that infest the blood and bile of the infected cattle. Though these experiments, and certain collateral inquiries relating to the sources whence they may have been derived, are still in progress, and may be continued a year or more, the chief object of such culture-experiments should be stated here. The design of the effort is not so abstruse as may be supposed. Divested of details, and of the marvelous things that are associated with the several stages of development in the parasite fungi, the object and the art of spore and parasite culture may be stated in ordinary phraseology as follows:

The spores or vegetative germ matter found in the blood and bile of the infected cattle, present, in the fresh specimens, certain peculiarities that are sufficiently definite to enable skillful microscopists to recognize them with considerable certainty. We presented to Prof. Hallier, of Jena, sealed specimens of fresh bile from infected cattle, without intimating to him what results Dr. Stiles had obtained, and his description of what he saw exactly accords with what Dr. Stiles and his associates witnessed. This spore-growth in the fluids of infected cattle is, so far as Dr. Stiles was able to ascertain, invariably of the low or primordial kind of mere multiplication and growth, which is the germ-mass or micrococcus of Prof. Hallier. Growing and repropagating, away from all direct exposure to the atmosphere, this kind of spore is termed *anærophytic*, or growing without air. This circumstance of anærophytic multiplication and rapid growth is not singular, for the *oïdium lactis*, or fungus of milk—also anærophytic—illustrates this kind of vegetation; but it is manifest that the circumstances of such parasitic growths must necessarily occur wholly at the expense of the constituents of the fluid in which they float and multiply, for they grow without the aid of atmospheric air. As the spore-forms(or as the *micrococcus*, *cryptococcus*, *zoogloæ*, or *cylindrotænum* forms,) of fungus organisms all have relations to the higher and more complex development of plant-like fungi and algæ, the planting and cultivation of the micrococcus or spore-matter has become an art that promises important results. The very first contributions of the practically useful results of that art were given to hygiene. We refer to the study and development of the fungus-forms that pertain to the excrement of the cholera sick. And as

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the world is indebted to Prof. Hallier, of the University of Jena, for the chief discoveries and improvements that have been made in this difficult art of studying the progressive stages of cryptogamic development from the spore-matter or *micrococcus* up to the plant-like stages of growth, we secured the coöperation of that learned naturalist with Dr. Stiles. He has presented his researches upon specimens of fresh bile that we sent to him under seal. The statement of results in this fungus-culture by Prof. Hallier, will be seen in the communication from him, which we append to Dr. Stiles' report in the next chapter.

There is much reason to believe that this spore-growth, which both gentlemen are studying, will be found to belong to certain parasite fungi that infest the coarse herbage which covers certain tracts of country over which the Texas cattle are driven before reaching the Osage, the Red, or the Mississippi rivers. Some of the grasses of that region are already under examination by Dr. Stiles and others. No final results can be reached immediately in such an inquiry, but the clear and definite progress already made in this line of researches is sure not to end in barren uncertainties. Yet it must not be supposed that a correct general knowledge of the "Texas cattle disease" will not be attained independently of this promised contribution from the natural history of the fungus-spores of the infected blood and bile of the cattle and of the parasites which infest the herbage of the cattle trail. These toilsome researches may result in unveiling one of hidden and all-important *factors* of a class of epizoötic and epidemic pestilences that hitherto have defied all attempts to interpret their mysterious origin, and to discover the nature of the virus or germs by which they are propagated as spreading pestilences.

In the present state of medical knowledge, we can only designate this probable fungus or parasite element in the cattle disease as a *factor* in the sum of causes.* It may be the essential and most

* "In the great field of the epidemic and contagious disorders by which the animals that minister to man are afflicted, a rich harvest yet remains to be gathered. * * * * * * * * * A searching investigation into them would open up analogies that could not fail to be of the deepest interest in their bearing on the great group of kindred maladies which are so fatal to man. It is not too much to say that many a vexed problem relating to these last would here find a ready solution. It is, in fact, only by thus extending the survey that it is possible to obtain a just and comprehensive view of the nature and mode of propagation of that great and remarkable brood of morbific agents which are the material cause of contagious diseases, and which, low as they are in the order of created things—as yet undefined in nature, but specific in essence—are so destructive to men and animals alike. * * * * * *

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important factor, or it may be subordinate to some others; but it now seems probable that the transportation and spreading of the disease by the Texas cattle, would be impossible, if this parasitical element or factor were absent or were controlled. It is not unreasonable to presume that the presence and destructive, as well as irritant effects of this fungus parasite in the blood and the liver, would almost necessarily induce the very changes and fatal conditions which are actually found in the cattle that die of this disease. But science and the art of sanitary prevention of disease will lose nothing by accepting all the facts and possibilities on this subject, in the same cautious and exacting way in which we have ventured to mention it in this report. That the effort to discover the precise nature and source of the *infective carrier* of the pestilences which are spread by means of *excrement*, as in the case of cholera, typhoid fever and this disease of cattle, will, ere long, be successful, and will lead to the extinction or effectual prevention of them, is regarded probable. And there is reason to believe that this disease of cattle will yet furnish a clear demonstration in this line of study into the causation and spreading of this and some other pestilences.

"By this and other means so employed, we might, in no long time, succeed in investing our knowledge of whole provinces of disease with much of that precision which is the charm of the physical sciences, and medicine's greatest want. By the same means, we should gradually be accumulating data whereby to make the work of prevention sure, and thus help towards that great consummation to which we may even now confidently look—the ultimate deliverance of man from that vast brood of contagious diseases which at present seem to mock his power—whose very existence is a humiliation to him, and which, under the form of slighter visitations or of wide spread pestilence, bring every year so many millions to the grave by a cruel and untimely death.—*On the Occurrence of the Malignant Pustule in Man, by William Budd, M. D., London*, 1863.

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V. REPORT ON THE PATHOLOGY OF THE TEXAS CATTLE DISEASE.

BY R. CRESSON STILES, M. D.

To ELISHA HARRIS, M. D.:

SIR—The following contributions to the pathology of the disease which has recently proved so fatal to the cattle forwarded from the West to the New York market, are based upon microscopical examination of the diseased organs collected at various abattoirs in the vicinity, and upon experiments upon the nature of the morbid secretions. The uniformity of the elementary alterations of structure, amid a variety of diseased appearances in both solids and fluids, was one of the most interesting and satisfactory features of the epidemic. It establishes the existence of a well-defined group of symptoms and of corresponding pathological changes of structure which it is of the highest importance, both practical and scientific, to record accurately and publish widely.

With the etiology, symptomatology, therapeutics and prophylaxis of the disease, this report has no concern. On several occasions I was present at the *post mortem* examination of diseased cattle, and collected such specimens as I required for study, but by far the greater number were forwarded to me by yourself, or by your friends in Chicago and the West, where the disease has prevailed to a far greater extent than in our neighborhood. From whatever source derived, the same story was told by all; the epidemic which has destroyed thousands of cattle in the West, was identical with that from which the Board of Health has sought to protect our markets for the past three months.

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PART FIRST.

I. THE FLUIDS.

(1.) *The Blood.*—The blood examined, was usually drawn from the aorta or carotid arteries at the time these were severed in slaughtering the animal. In other specimens it was taken from the jugular vein during life, or from the portal vein after death. In none but the last was there any marked peculiarity by which it was distinguished from the foregoing. It coagulated firmly in a large and deep vessel within fifteen minutes, without a buffy coat. In no case did the quality of the fibrin seem impaired. It presented invariably a delicate fibrillation when in shreds, and a finely granular appearance when in mass. The red blood-corpuscles when examined immediately after removal from the body, were shriveled and *crenated*, without artificial provocation, as represented at *b b*, Plate 1. In one case, many of the discs appeared to have lost a portion of their substance, as if a circular piece had been punched out, the addition of water failing to restore the disc to completeness. In one specimen only, the white blood-corpuscles were in great excess and aggregated in masses. The *liquor sanguinis* was invariably of a yellower color than natural, and contained minute yellow flocculi or flakes of granular matter of irregular size and shape, as represented at *c*, *c*, Plate No. 1. After a clot had formed, the serum was found to present a yellow tinge, due to a diffused coloration. The source of the yellow coloration was indicated by the occasional presence in the serum, after standing for several hours, of rhomboidal-notched plates, such as were found also in the bile, and consisted probably, of cholesterine. In several instances, defibrinated blood, or serum poured from a clot, which originally abounded in corpuscles, was found after a few hours to be absolutely devoid of the latter, complete dissolution of the red discs having taken place long before putrefaction.

The specimen of portal blood abounded in white blood-corpuscles, and in morbid cellular elements from the parenchyma of the spleen.

(2.) *The Bile.*—The bile was, in all the cases which fell under my observation, abundant, distending the gall bladder to its utmost capacity, filling the hepatic duct, and constituting the principal portion of the contents of the small intestines. Instead of present-

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ing the normal greenish or brownish transparency, it was opaque, thick and grumous, nor was its opacity lost on filtration. It contained granular flakes and masses of a brilliant yellow or orange tint to transmitted light, reddish brown on the filter by reflected light, as represented at *a a*, Plate 2. These were in many cases so abundant as to give the bile a semi-solid consistence. They presented, when the bile was most dense, a crimson coloration, and were then mingled with granules and stellate crystals of hematidine (Virchow), *c c*, Plate 2. These yellow flocculi abounded in the hepatic duct and its branches, and were found at times impacted so that they might have offered resistance to the flow of the bile into the gall bladder. Some of the yellow coagula had been molded by the smaller biliary ducts into cylindrical casts, *b*, Plate 2, and were found presenting this shape in the gall bladder. Plate No. 2 represents the appearance of a drop of bile under a magnifying power of five hundred diameters.

It was evident that the source of the yellow flocculi in the bile was an admixture of blood with the bile in the minutest ducts within the substance of the liver. The blood-corpuscles being dissolved, the coagulating fibrin imbibed the bright yellow dye of the mingled coloring matters of the bile and the red blood-corpuscles.

I have preserved specimens of this morbid secretion for nearly three months. They manifest no tendency to decomposition, but give off a sweetish aromatic odor; crystals of oxalate of lime have formed in the yellow flocculi, and micrococcus germs have multiplied so as to form masses visible to the unassisted eye.

(3.) *The Liquid Contents of the Small Intestine* abounded in the yellow flocculi of the bile. The hardened fæcal masses in the large intestine consisted of homogeneous yellow granules (the result of condensation of the yellow flocculi), mingled with epithelium and vegetable débris. Constipation was a prominent symptom in most cases. Of the bile, therefore, which was so abundantly poured into the alimentary canal, but a small quantity left the body in fæcal evacuation.

The fourth stomach and intestines were occasionally filled with coagula of blood. Specimens of coagula were sent me, but I did not witness a case of the kind.

4. *The Urine.*—The urine was opaque, and black, with a crimson reflection. It formed a solid coagulum on boiling. When much diluted with water it became of a claret color. Blood-discs were

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rarely found in it, but coagula of granular fibrin, *a a*, plate 3, enclosing débris of blood corpuscles and dark crimson granules, and molded into *casts of the tubuli uriniferi*, were of frequent occurrence. The dark red coloring matter of the broken-down blood discs was diffused through the urine.

(5.) *The Peritoneal Cavity* contained a yellow liquid which owed its tint to a diffused coloration, and was spontaneously coagulable on exposure to the air. In one case, where a few drops of blood had been accidentally mingled with it, coagulation continued for two days, and until putrefaction commenced. A fresh gelatinous clot formed in the liquid as often as it was poured from the coagulum previously formed. This was but one among many interesting physiological phenomena revealed by study of this disease.

II. THE SOLIDS.

(1.) *The Liver.*—The liver was invariably enlarged and congested, its surface marked by yellow patches, or of an uniform yellowish discoloration. The surface of section presented yellow spots on a ground of deep congestion. Under a low magnifying power, a thin section presented the appearance represented in plate No. 4. A translucent center of bright yellow was seen in each acinus, *a*, plate 4, surrounded by an opaque zone, *b*, plate 4, of mingled fatty degeneration and yellow injection. Surrounding each acinus was the fibrous striation of the capsule of Glisson, *c*, plate 4. Under a power of five hundred diameters, the yellow color of the center of each lobule was seen to be due to the repletion of the ultimate biliary radicles, forming a regular net-work between the liver cells, with bright yellow secretion, *a*, plate 5. About this, and shading into it, was a zone of fatty degeneration, which affected the superficial or portal portion of each lobule. This fatty degeneration was sufficiently marked to render the liver cells opaque, but the nucleus was still visible in many of them. The injection of the reticulum of bile ducts was the most interesting phenomenon presented by the disease, not only on account of the opportunity it afforded of studying an anatomical structure, which has given rise to much discussion among histologists, and concerning which great difference of opinion still exists, and on account of the beauty and perfection of the anatomical demonstration, but owing to the important relation which this phenomenon bore to numerous manifestations of the disease. The cause of the difficulty in determining the mode of origin of the bile ducts, was

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seen to consist in their fragility and intimate association with the liver cells, each cell on being separated from its neighbors carrying with it its portion of biliary reticulum. The delicacy of the membrane forming the walls of the reticulum, renders its thorough injection impracticable, and its recognition, when empty, impossible. The brilliant tenacious secretion of the liver in this disease distends and reveals every portion of the biliary channels. The larger ducts between the acini can be recognized in every carefully prepared section communicating with the intra-lobular reticulum. Immediately after death, the yellow secretion begins to pass out of the reticulum by exosmose, and to tinge the liver cells with a diffused yellow coloration, so that it is difficult to preserve the biliary reticulum for anatomical demonstration. Plate 6 represents the liver cells examined several hours after death. In other specimens the injection is more permanent, and I have been enabled to save for demonstration portions of diseased liver which still reveal the most marked phenomenon of the disease.

The source of the bright yellow coloration of the bile was evidently in the hæmatoidine (Virchow) of the broken down blood-discs. The coagulating fibrin of the effused blood, absorbing this yellow dye, formed the characteristic flocculi of the bile; the same absorbed by the capillaries of the liver gave rise to the yellow flakes circulating with the blood, and found abundantly in the spleen.

The mucous membrane of the hepatic duct was always of a bright crimson hue.

In one instance, in which the injection of the reticulum of bile-ducts was most marked and most permanent, there was no fatty degeneration of the enlarged liver, but a waxy appearance.

(2.) *The Kidneys.*—The kidneys, in every post mortem that I witnessed, were enlarged, deeply congested, black on the surface and in section, the cut surface giving issue to an abundance of dark blood. The natural distinction of color between cortical and tubular portion was effaced. The tubuli uriniferi of both the cortical and tubular portion were rendered opaque by a deposit of granules of fat in their epithelium, and their cavity was occupied, for the most part, by coagula, reddened or blackened by débris of blood-corpuscles, and by granules of dark crimson pigment, with occasionally a recognizable blood-disc. Plate No. 7 represents the appearance of the tubuli of the kidney, as affected by the disease. The Malpighian bodies were not affected, but blood was occasionally found effused within their capsule. The tubular presented the same alterations as the

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cortical portion. In one instance, in which the projecting cones of the tubular portion presented to the unassisted eye a glittering yellow coloration, it was due to rhomboidal plates and stellate crystals of hæmatoidine. Minute yellow oily drops were occasionally found scattered through the epithelial lining of the tubes.

An interesting alteration in the effused blood was noted in cases of long duration, and during convalescence. The red pigment within the tubuli was changed into melanine, and black pigment-granules filled the epithelium of the tubuli. The transformation of hæmatoidine into melanine was beyond question. Long after every other morbid character had given place to healthy structure through convalescence, the cortical portion of the kidneys retained the black coloration due to granules of melanine.

(3.) *The Spleen.*—Increased size and weight of the spleen was an invariable accompaniment of the disease. At the same time the consistence was diminished to such a degree that it gave issue to a soft black pulp on section, in which all trace of structural arrangement was lost. The increased size of the spleen was not due to congestion merely. A remarkable alteration was presented by the nuclear and cellular elements of the parenchyma. The nuclei (nuclear epithelium, Robin), or the same with delicate cellular investment, which in the natural state, fill the closed vesicles of the Malpighian bodies and the trabecular interspaces, were replaced by the large cells undergoing fatty degeneration, which have been represented in plate 8. In some instances, yellow flocculi were found free in the splenic pulp; in others, cells filled with black pigment-granules and crystals of hæmatoidine were abundant. The appearance presented in plate 9 always accompanied convalescence. The cellular elements rapidly regained their normal character, but the pulp was filled with minute homogeneous rounded yellow granules, or with spherical or oval aggregations of the same.

(4.) The *mucous membranes* of the fourth stomach and intestines, and of the urinary and gall bladders presented a diffused redness, with minute petechial spots, in which coagulated blood was found filling the distended capillaries. The epithelia of these membranes presented no marked alteration. The various states of congestion and ulceration in the alimentary canal offered no revelations of interest to microscopical study.

(5.) The *muscular system* presented a darker coloration than in healthy animals, but under the microscope revealed no alteration in structure.

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(6.) The *nervous system* was entirely free from discoloration or structural change.

(7.) The *adipose and areolar* tissues were tinged by a diffused yellow coloration. Occasional yellow flakes were found in them, and about the kidney, circumscribed extravasations of blood. Beautiful crystals of hæmatoidine were found in old extravasations.

(8.) The *lungs* were remarkably free from acute disease.

PART SECOND.

CONCLUSIONS IN REGARD TO THE PATHOLOGICAL NATURE OF THE DISEASE.

To sum up the results of microscopical investigation, and give the pathological conclusions to which they point, the Texas cattle disease is an acute, infectious, febrile disorder, attended by morbid action of the liver, its most distinctive phenomena being explicable as the results of the hepatic affection. The dissolution of the coloring matter of the blood-corpuscles in the liquor sanguinis, and the hæmaturia are consequent upon the entrance of bile into the blood vessels, in whatever manner effected. In the experiments of Kühne and Frerichs, the injection of bile or of its salts, into the blood, was followed in the great majority of their experiments, upon the lower animals, by the appearance of blood in the urine. The solvent action of the bile upon the blood-corpuscles, and the consequent liberation of their coloring matter can be readily witnessed under the microscope, each disk disappearing suddenly, like a light blown out, and the liquid assuming an orange tint. The blood thus altered in character, becomes liable to extravasation, other hæmorrhages than hæmaturia being frequent attendants upon attacks of jaundice.

That bile is mingled with the blood, is proved by the yellow color of the serum, its yellow flocculi, its crystals of cholesterine, by the yellow drops in the epithelium of the tubuli uriniferi, by the yellow granules in the spleen and by the hæmaturia. These results cannot follow the mere accumulation in the blood of the constituent elements of bile; the proximate principles of the bile

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itself are there found. The liver is excited to excessive secretion, the product of which distends to excess the channels and reservoirs of the bile, and fills the intestines. It is not unusual to find cases of Icterus in man thus accompanied by excessive biliary secretion.

That the greatest facility exists for admixture of bile with the blood, is shown by the repletion of the reticulum of bile ducts in immediate contact with the capillaries of the liver, as well as by the abundance of bile exposed to absorption by the mucous membrane of the intestines. In the experiments of Dr. Randall, under your direction, in which rabbits were fed upon bread soaked in the bile of the Texas disease, death ensued in from one to four weeks, according to the amount of bile consumed. In these experiments the poison was absorbed by the mucous membrane of the alimentary canal. The stomach was found ulcerated and containing extravasated blood, the liver was softened and fatty, the bile was of a bright claret color, and contained coagula; the kidneys were deeply congested; thus death was caused by the absorption of bile, with many of the phenomena of the Texas disease in a chronic form.

The only alternative to this admission of the vitiation of the blood by bile, is the hypothesis that the destruction of the blood-corpuscles through another agent—that of the infection, for example—permits an accumulation of hæmatoidine, or of the coloring matter of the bile in the blood, beyond the capacity of the liver to remove it. The yellow flocculi of the liquor sanguinis, and the spleen, would, however, be inexplicable on this hypothesis, while their formation through the agency of the liver is manifest.

Quite early in this investigation my attention was attracted to the existence in the diseased bile of minute vegetable germs, which multiplied abundantly in the various specimens of bile preserved for analysis. They existed in the form of spherical or irregular aggregations of micrococcus (fig. 1, plate 10), the nature of which could be determined only by the employment of the highest powers of the microscope, and by studying their development. They were found in fresh blood and bile, but with difficulty. In specimens of bile collected in the evening, they would be found abundantly in the morning; the white color of their aggregations contrasting with the yellow hue of the flocculi of the bile to which they were attached, and from which they seemed to be derived, their abundance being such as to preclude the idea of their derivation from any other source than the blood, or the bile itself. A magnifying power of over one thousand diameters and a lens of good penetrat-

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ing power were necessary to their definition. Within a few hours of removal from the body, numerous cryptococcus (or torula) cells, resulting from the development of the former, were found, often containing crimson granules, as represented in fig. 6, Plate 10. Specimens of bile and blood were collected from healthy animals, and carefully examined, but in no instance did the forms described make their appearance. The ordinary attendants on putrefaction were alone descried. Whether these forms of micrococcus and cryptococcus were merely accidental and attendant on a process of fermentation taking place in the bile, or were peculiar to the disease, their presence was an interesting fact, and their nature deserving of careful investigation. Their development was accordingly studied under various conditions. They were planted in solutions of sugar, gum and saliva, which had been boiled in order to destroy whatever germs of a different nature the solutions might contain, and were kept hermetically sealed at a temperature of 100° Fahrenheit, for several days. The resulting anaerophytic forms (cryptococcus and torula, fig. 4, Plate 10) were planted on slices of apple, etc., and their development was noted, as represented in Plate 10. After a period of two weeks the planted area was found covered with penicillium, as represented in plate No. 12, while the rest of the surface was free from vegetable growth. At the same time cryptococcus guttulatus, from the intestine of a rabbit which had been fed on the morbid bile, was also planted on slices of apple, and the germination, represented in Plate No. 11, noted. This was done for the purpose of comparison merely, cryptococcus guttulatus being constantly found in the rabbit. The cryptococcus from the bile, however, manifested very different phenomena, although under precisely similar conditions with the former. After two weeks it had merely increased in quantity, aggregations of spores having been formed visible to the naked eye, but no filaments.

These forms of micrococcus and cryptococcus are but grades in the life of higher organisms. Thus, Hallier gives the following forms or "morphen" of Achyla Prolifera:

	Anaerophytic	*Schizosporangium*	*Aerophytic*
Ripe form ..	Tilletia caries	Sporidesmium	Cladosporium
Mould.....	Oidium lactis	Mucor racemosus	Penicillium crustaceum

I have taken warning from the numerous disappointments of microscopists, whose spores and germs of diseases have sprouted

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luxuriantly for a while in popular reputation, but have had a mushroom duration only in the annals of science. I am aware that the micrococcus and torula forms of fungi, alike in all, give no evidence of their nature and origin, and that all that can be said respecting those I have had under observation is, that it is possible that these germs, developing luxuriantly in the bile and voided with the fæces, may be the source of the contagion which proves so fatal in the Western pastures where Texas cattle have occupied them in advance of native herds. Whatever may be the bearing of these researches upon the etiology of the disease, they have an abstract interest and value independently of their practical application.

The fungus origin of zymotic diseases is now conceded by the highest authorities in mycological research, and the Texas fever is one which points with unusual clearness to this mode of propagation. That Texas cattle should communicate the disease while in a state of apparent health, and that Northern cattle dying from the virulence of the infection should be, as a rule, incapable of communicating it, can be readily understood on the hypothesis that a definite stage or amount of development is required by the organic germs of the contagion before they became capable of giving off the infectious spores by which it is propagated. The history of yellow fever shows how complete may be the immunity acquired by acclimation against a virulent form of contagion, and if the disease we have been studying were denominated "bovine yellow fever," no fault could be found with the designation. It is now admitted that persons in apparent health may convey the germs of cholera Asiatica from an infected district, their excreta undergoing a kind of fermentation through the multiplication of fungus germs, rendering them highly infectious.

According to recent researches, the different stages in the development of the same fungus possess very different properties and react very differently upon the human system. Thus the best authorities assert that achorion schœnleini, which is known to be the cause of herpes circinatus and of favus, as I have proved also by my own experiments, is but an oidium form of the same plant, which gives origin to penicillium crustaceum. If so, what limit can be set to the morbid capabilities of the commonest species of fungus? Their capacity for mischief must be as varied as the conditions of their development. So pliable are these low forms of vegetable life, that their injurious influence upon the human system, and upon the animal organism, need not be sought in their specific character,

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but may be ascribed to a virulence acquired by the circumstances, conditions, direction and degree of their development. This fact has received ample illustration by the researches of Prof. Hallier upon the fungi attendant upon the exanthemata.

In the hottest period of summer, when the liver is excited to unusual activity, cases presenting many of the features of the Texas disease in cattle are not infrequent in man. They present the same fatty degeneration and boxwood discoloration of the liver, the hæmorrhages into the stomach and intestines, albuminuria and fatty degeneration of the kidneys, intense jaundice, yellow grumous, but usually scanty biliary secretion, high fever, softening of the spleen; all these characteristics without the suspicion of yellow fever infection. In some of these cases disorder of the liver is the only recognizable cause of a train of symptoms ending in black vomit and death; in others, Bright's disease of the kidneys is the basis upon which these symptoms are engrafted. In these cases and in yellow fever, an acute cholæmia or admixture of bile with the blood is the most decided of all the pathological phenomena. The group of symptoms and lesions in the Texas disease is therefore well established, and corresponds to the action of a not unusual combination of causes, as well as to that of the yellow fever miasm. The application of the term *yellow fever* to the Texas disease of cattle, is warranted both by its pathological characteristics, and by the source of the contagion. From examination of the liver of yellow fever, I am confident that the same injection of the biliary radicles would be found as in the Texas disease, could the liver of the former be obtained under the same conditions that revealed that structure in the latter.

The pathological alteration in the liver of yellow fever is not a fatty degeneration merely, as is often asserted. The boxwood color can be derived from the biliary secretion only, and the liver of the Texas disease, and that of yellow fever, present precisely the same appearance when examined a number of hours after death. The yellow coloration in the Texas disease is undoubtedly due to an admixture of blood with the bile at its source, or to a superabundance of hæmatoidine from broken down blood-corpuscles in that secretion, and such may be considered the cause of the peculiar yellow coloration in whatever disease it may be found.

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Description of Plates of Microscopic Anatomy.

PLATE No. 1. *a, a,* Normal blood discs. *b, b,* Shriveled and crenated blood-corpuscles of the diseased blood. *c, c,* Flocculi from liquor sanguinis. *d,* A crystal of cholesterine (?) from serum. (1,000 diameters.)

PLATE No. 2. Bile. *a, a,* Yellow granular flocculi of bile. *b,* A cast of a branch of hepatic duct. *c, c,* Crystals of hæmatoidine. (500 diameters.)

PLATE No. 3. Urine. *a, a,* Casts of tubuli uriniferi, consisting of coagulated blood. *b,* Element of epithelium. *c, c,* Blood discs. (500 diameters.)

PLATE No. 4. Section of the liver. (50 diameters.) *a, a,* Yellow translucent center of acini. *b, b,* An opaque zone of mingled fatty degeneration and yellow discoloration. *c,* Capsule of Glisson between acini.

PLATE No. 4½. Appearance of a fragment of liver. *a, a,* Portions of reticulum of bile ducts. *b, b,* Hepatic cells, filled with granules of fat. (400 diameters.)

PLATE No. 5. Reticulum of bile ducts within an acinus injected with the yellow tenacious bile peculiar to the disease. *a,* Reticulum. *b, b,* Hepatic cells containing globules of fat. *c,* A separate hepatic cell with its portions of reticulum. (500 diameters.)

PLATE No. 6. Liver cells several hours after death. The coloring matter has passed from the reticulum into the cells. *a,* Nuclei. *b,* Globules of fat. (1,000 diameters.)

PLATE No. 7. Kidney. *a, a.* Tubuli uriniferi of kidney (their epithelium filled with granules of fat), containing extravasated blood. *b,* Fragment of epithelium.

PLATE No. 8. Spleen cells and nuclei of splenic pulp. *a,* Normal element of nuclear epithelium. *b, b,* The same enlarged, their nuclei filled with granules of fat. *c, c,* Cells containing colored corpuscles, like blood-discs. (1,000 diameters.)

PLATE No. 9. Elements of splenic pulp during convalescence. The cells are regaining their natural size. *a, a,* Homogeneous yellow granules. *b, b,* Aggregations of the same. *c,* A muscular fiber-cell. *d,* Element of nuclear epithelium regaining its normal size. *e,* Element of epithelium filled with granules of fat. *f,* Blood discs. (1,000 diameters.)

PLATE No. 10. Micrococcus found in bile and blood. 1. Appearance in fresh bile. 2, 3 and 4. Development of No. 1 in bile. 6. A variety of cryptococcus containing crimson granules from bile. 5, 7 and 11. Development of cryptococcus planted on a slice of apple; formation of filaments. (1,500 diameters.)

PLATE No. 11. *a, a,* Cryptococcus guttulatus from intestine of rabbit. *b, b,* Development of the same when planted on a slice of apple. (1,500 diameters.)

PLATE No. 12. Development of cryptococcus from bile on a slice of apple. Penicillium. (1,500 diameters.)

PLATE No. 13. Crystals of hæmatoidine from diseased kidney—the same existed in extravasations of blood into the cellular tissue surrounding the kidney. (1,000 diameters.)

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[NOTE.—The interest that has been awakened by the announcement of the first results reached in this line of investigation by Dr. Stiles, is reasonable, and the importance of the ultimate truths and results to which it relates, warrants the continuance of this investigation. The following communications which Prof. Hallier sends to us from Jena, present the first results he has reached, and fully substantiate the conclusions previously reached by Dr. Stiles. As such elements of useful knowledge grow best by accretion and criticism, none of them should be withheld from publication. The lithographed figures upon the opposite page, are *fac similes* of Prof. Hallier's pencilled sketches. In the course of correspondence, this renowned Mycologist of the University of Jena, Prof. Hallier, early in October last, made the following statement to us:

* * * * * * * * * *

I scarcely know of anybody whom I might entrust with scrutinies of such importance as these mentioned in your letter. * * * * * The method of cultivating these small plants, I discovered by very hard work, by a great number of researches continued through years, and now I believe myself able to discover the origin of every vegetable cell found in the human or animal body. * * * * * * * * *

* * * * * * * * * *

If you can send to me bile and blood of the infected cattle, *I hope I shall be able to find out the origin of the cryptococci or micrococci.* * * * *

With my best regards,

Most truly yours,

(Signed) E. HALLIER.

In his second communication, Prof. Hallier writes as follows:

JENA, *December 5th*, 1868

To ELISHA HARRIS, M. D., *etc., etc.:*

SIR—I am very greatly indebted to you for sending to me a vial filled with bile of the infected cattle. I received it safely on the 22d of last month. I immediately examined the contents of the vial, and found two different kinds of vegetable cells.

(1.) Micrococcus (of some kind of fungus) in large masses, many of them single and globular (a), others single and long shaped (b), forming mycothrix chains (mycothrix ketten), others in a state of division (c), and sometimes forming large or small colonies (d), (micrococcus kolonia).

(2.) Cells of much larger dimensions, and of the shape of cryptococcus, or rather, intermediate between cryptococcus and arthrococcus, most of them sprouting like true cryptococcus, but sometimes dividing and forming two equal limbs.

After this examination, I began a series of cultivations with the vegetable (micrococcus) cells.

(1.) Cultivation upon an object glass (without a covering glass). The food provided for the fungus was composed of boiled spring water, a portion of starch, sugar, and an equal portion of phosphate of ammonium (phosphorsaure ammo-

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niak). The object glass was put into a culture apparatus (Hallier, Gährungserscheinungen, p. 13, fig. 3). In this apparatus in my room, at a temperature of 20° centigrade,* the micrococcus was in rapid augmentation on the 24th of November.†

The micrococci were swelling and forming the larger cryptococcus-like cells. In the first days of December, many of the larger cells germinated and formed long filaments with many branches, and of a brownish color.

Similar results I have obtained in other cultivations.

(2.) Cultivation on a lemon (deprived of its shell) in a similar apparatus.

The micrococcus forms large cells in the same manner as in the first cultivation (December 3d).

On many spots the micrococcus is augmenting to such a degree as to form large colonies. Near the outline of these lobular colonies the micrococci swell and become large cells of the same kind. In a few days the colonies only consist of these cryptococcus-like cells. These colonies become rather hard, and at last have a diameter of 0.001 m—0.002 m. They are of a white color, and have the appearance, and, according to my opinion, even the function of a *sclerotium*. As soon as the *sclerotium* is formed, all the cells in it germinate in the same manner as the single cells. Of course, they form great masses of filaments, or rather forests of filaments, as seen in figure 7, with a *low* power of the microscope. The filaments are of the same size and shape as in the first cultivation. In the midst of the little forest they form much larger cells, or rather fruits of that kind, which I called "Schizosporangia," divided by sheets‡ in one, two or three directions.

As you may see by looking at these few figures (No. 8), the shape of the schizosporangia is very various. The schizosporangia have the utmost resemblance to those whose micrococcus I discovered in the blood of the glanders of horses, and also in syphilis. Only look at the figures Nos. 11, 18 and 21.

On the upper surface of the sclerotia are forests of filaments, and these filaments never form schizosporangia, but a cladosporium fruit (see No. 9), also similar to a correspondent form of the glanders and syphilis fungus. As soon as the soil begins fermentation, the cladosporium branches alter and take the form of the same penicillium, which I met with in the syphilis exploration (Figs. 12 and 13.) It is possible that our fungus is no other than the "coniothecium syphiliticum," whose origin till now is unknown. * * * We wait for the conclusion of the different cultivations. These are:

(3.) Cultivation on the surface of a cork, disinfected by submersion in alcohol for an hour. Till now the result is the formation of the same sclerotia, and just now the cells of them begin to germinate.

(4.) Cultivation on the surface of a potato (the skin cut off). Till now only vast augmentation of the micrococci.

(5.) Cultivation in a solution of sugar and phosphate of ammonium. (The apparatus I have not yet opened.)

(6.) Cultivation on albumen of eggs, with a small portion of sugar solution. Great apparatus (Grosser isolation apparatus) [Gährungserscheinungen, p. 14, Fig. 2.] This cultivation has the purpose of discovering the type form (anerophytische morphe§) of the fungus, and may require two months' time.

* 68° Fahrenheit scale.—E. H.

† The second day after Prof. Hallier's reception of this specimen from New York.

‡ Partition faces.

§ Anerophytic form or mode.—E. H.

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I have already succeeded in discovering three forms of the fungus:

1. Schizosporangium.
2. Ærophytic spores (ripe), mature.
3. Ærophytic spores (unripe), immature or "mold" form.

There still must be discovered three other forms:

1. The unripe form of the schizosporangia (mucor or mold).
2. The anærophytic spores (ripe).
3. The anærophytic spores (unripe), oïdium form.

As soon as I succeed in getting any more results I shall write to you. I hope you still succeed in getting the same forms in your cultivations. * * *

With my best regards, Most faithfully yours,

(Signed) ERNST HALLIER.

Manifestly, it is not a common and familiar form of *oïdium* or *penicellium* that Dr. Stiles and Prof. Hallier have been studying, or they would quickly have recognized and named these beautiful fungi. The fact is instructive, that in the cool weather of October we were able to send a specimen of the infected bile from New York to Jena—four thousand miles—without change, and with the spores alive, and evincing all the capabilities of higher development into plant-like forms.

It is not the present habit of science to depend upon hypothesis, because true knowledge patiently awaits demonstrations and absolute facts; but every reader of Prof. Hallier's letter and Dr. Stiles' report concerning this parasite will not fail to remark how persistent and enduring is its own vitality. It survives and flourishes for months after being taken from the gall bladder and the blood of the infected bullock; and there is reason to believe that it would live and grow in muddy streams on various kinds of algæ. It is certainly an interesting and suggestive fact that, so far as the researches of Dr. Stiles and Prof. Hallier have extended (to date of this report), the type of fungus which they have found developed from these spores is one that finds its home in the carex, the lolium, and the wheat-like or tilletia grasses. Whatever results may be attained in the researches now in progress, including the examination of grasses, the cultivation of the fungus upon them and in fluids, as well as the study of the *development* of the fungus in its several stages, will be equally interesting to herd-farmers and to hygienists. The results, whatever they may be, shall be given to the public through the proper channels. E. H.]

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[NOTE—After the manuscript for this report had been delivered to the Board of Health, and arranged for the printer, the following communication was received January 11th, from Professor Hallier:

JENA, *December 18th*, 1868.

DEAR SIR—To-day I can give you the results of my cultivations of the fungus which you sent to me. As I mentioned in my last letter to you, the fungus of which the micrococci and the cryptococcus-like cells take their origin, is a species of the genus coniothecium. This form of coniothecium is the true *brande* form (anserophytische morphe) of the fungus, growing only in the interior of the strata, or at least not under the influence of the open air. You get it best by cultivating the bile on a lemon deprived of the exterior portion of the pericarpium.

The germinating cells of the fungus form, on most parts of the lemon covering, the penicillium form of which resembles very much the penicillium syphiliticum. On the dryer spots of the lemon you will see filthy masses of a dark greenish color. If you put these masses upon the object-glass, and put a drop of caustic potassa to it, you will very clearly see the coniothecium fruits surrounded by many filaments of ripe cladosporium with long spore chains.

Upon dry vegetable matters, like disinfected cork or potatoes, I have seen the cells of the fungus (spores) germinating in the same manner as on the lemon; but instead of the coniothecium (in every one of my cultivations of these spores), the filaments bore the true schizosporangia of which the following figures give you an idea.* The schizosporangia are formed on the ends of branches, not interstitial like the coniothecium. The fruits are of very different forms, and of a dark brown color; they are scarcely to be seen by the naked eye, but with a lens you see black spots on the cork or potato, and these spots are covered with fruit-bearing filaments. On the potato the schizosporangiæ occasionally do not ripen, and in this case, if the potato is moist, the unripe or mucor-form appears. (See c, c.)

Notwithstanding the great similarity of the coniothecium syphiliticum and the species here described, they are entirely different. I tried to cultivate the syphilitis fungus at the same time (on the same days that I was cultivating the spores from diseased cattle), and upon the same substances, but never got the schizosporangia under the same circumstances as those observed in the cultivation of the fungus from the infected cattle in America. Our coniothecium from the bile of the infected animals was unknown till now, and for this reason, allow me to give it the name of Coniothecium Stilesiarium, in honor of the first discoverer of the parasite vegetable-cells in the blood and bile of the infected cattle.

Of this coniothecium, we have now succeeded in getting all the ripe (mature) and unripe (immature) forms.

* See plate 33, figs. 4 (b), 7, 12 and 13.

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1. Type-form (anserophytic spores) [ripe] Coniothecium Stilesiarium.* [unripe] Oïdium-like filaments.† } 2. Schizosporangia (Septosporium, according to the ancient system) Mucor Coniothecii Stilesiani.

3. Aërophytic form: [ripe], Clodosporium; [unripe], Oidium-like filaments (according to the system, Coniothecium Stilesiarium).

Perhaps you may succeed in finding out *the places where this coniothecium grows in nature*. At all events, *it is a parasitical fungus, growing on plants, and to be looked for in the food of the wild bullocks*. I began a new series of cultivations a few days ago, and if the results in any point are different from the first cultivation, I shall write to you another time about this matter. With my best compliments to Prof. Stiles, I remain

Most respectfully yours,

ERNST HALLIER.

DR. E. HARRIS, *Metropolitan Board of Health, New York.*]

* See plate 33, figs. 4 (b), 7, 12 and 13.
† See plate 33, fig. 4 (a).

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VI. PROF. CHANDLER'S REPORT UPON HIS CHEMICAL INVESTIGATIONS.

SCHOOL OF MINES, COLUMBIA COLLEGE,
NEW YORK, *December 1st*, 1868.

To E. HARRIS, M. D.:

DEAR SIR—I have the honor to report, herewith, the results of my investigations of the blood, bile, etc., of diseased cattle, which you have sent to me from time to time. The analyses are as accurate as can be expected of such complex and putrescent fluids, during the warm summer months. The first samples spoiled on our hands, so that the analyses could not be completed.

I avail myself of this opportunity to call your attention to the valuable services of my assistants, Dr. Paul Schwitzer, Mr. F. A. Cairns, and M. D. Wheeler, Jr., A. M., E. M., who have been my co-laborers in this investigation.

Respectfully yours,

C. F. CHANDLER, *Ph. D.*

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TABULATED RESULTS OF THE CHEMICAL ANALYSIS OF BLOOD OF BULLOCKS.—By Prof. Chandler.

DATE.	Special Record of the Bullocks.	Water.	Solids.	Fibrin.	Red Corpuscles.	Albumen.	Fat.	Extractive matters.	Salts.	Total.
(1) August 17	Convalescent of J.T.Alexander's; killed on the 8th day of convalesence; had been sick longest and most severely of any of the 5 convalescents..	854.6	134.1	10.90	41.6	68.0	4.00	7.6	5.6	992.9
August... 26	Convalescent 15 or 16 days; from Mr. Alexander's herd, Communipaw	816.3	183.7	3.43	98.3	56.8	0.80	14.6	9.7	1000.0
August... 30	Blood from a cervical vein taken 4 days before slaughter from Mr. Piles' herd	857.2	142.8	6.90	50.7	63.8	.....	13.4	8.0	1000.0
August... 30	Second specimen from same animal.....	864.7	135.3	7.22	50.1	63.0	.....	7.9	8.5	1001.4
August... 30	From infected bullock at rendering dock.....	886.9	111.1	5.60	——	89.5	——	12.9	3.1	1000.0
September 4	Blood taken at slaughter of No. 3, above; specimen from the aorta	852.1	147.9	5.50	60.7	64.9	3.10	6.9	6.8	1000.0
September 9	Bright & Fagan's Ill. herd; killed in last stage	849.5	150.5	13.10	7.8	120.0	1.00	1.3	8.2	1000.0
September 9	.....	810.8	189.2	*1.30	——	176.7	——	9.4	11.6	1000.0
September 11	Bright & Fagan's Illinois herd; slaughtered in last stage; temperature in centre of liver, 108°	876.9	123.1	7.80	13.6	60.8	0.60	26.2	14.1	1000.0
September 13	From "Fah-Kee" herd; killed in last stage; fat	784.0	216.0	7.50	22.4	188.0	1.20	8.5	8.6	1000.0
September 14	B. & F. Ill. herd; killed in last stage; temp. 108°	839.1	160.9	2.18	42.8	90.2	trace	19.0	6.7	1000.0
September 26	Steer from D.Adler's Ill. herd; killed in last stage	816.7	183.3	9.66	97.3	65.1	.....	5.2	7.8	1001.8
October .. 11	Mr. Richardson's ox; Lafayette, Ind.; see pl. 23	809.1	190.9	8.27	——	169.8	——	4.9	8.6	1000.5
October .. 18	Abandoned from Illinois herd; killed in last stage	870.1	129.9	7.44	56.2	56.2	.....	4.7	9.1	1003.7
	ANALYSIS OF THE BLOOD OF THREE HEALTHY BULLOCKS, BY THE SAME METHOD AND THE SAME CHEMIST.									
December 18	Bulleck from Connecticut; fat	779.25	220.75	6.47	139.14	62.90	.....	4.23	8.01	1000.0
December 19	Bullock from Connecticut; very large.....	787.82	212.18	8.64	114.70	73.84	.....	6.32	8.68	1000.0
December 20	Bullock from Kentucky; fat.....	779.06	220.94	4.39	146.50	60.02	.....	8.02	7.01	1000.0

* Putrid before it could be weighed.

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SERUM FROM ABDOMINAL CAVITY.

DATE.	Water.	Solids.	Fibrin.	Blood Corpuscles	Albumen.	Fat.	Extractive matter.	Salts.	Total.
Aug. 30	940.8	59.2	7.7	.....	40.6	.....	3.1	7.8	1000.0
Sept. 4	963.8	36.2	.....	.....	27.9	.....	5.9	2.0	1000.0
Sept. 9	787.7	229.9	10.7	21.9	157.6	0.6	.....	39.1	1007.6
Oct. 11	815.6	184.4	9.3		168.6		4.4	7.4	1005.4

THE BILE.

DATE.	Water.	Solids.	Specific gravity.	Fats.	Mucus.	Cholates etc.	Salts.	Total.
August 26	928.7	71.3	.....	2.15	6.37	62.8	.....	1000
Sept... 4	941.9	58.1	.....	2.44	1.51	54.1	.....	1000
Sept... 4	920.2	79.8	.....	.....	.....	.....	11.40	1000
Sept... 9	915.5	80.5	.....	3.16	11.10	66.2	.....	1000
Sept... 11	944.8	55.2	1016.0	.....	.....	.....	9.66	1000
Sept... 14	886.9	113.1	.....	1.04	17.05	94.9	.....	1000
Sept... 25	865.4	134.6	1030.5	.....	.....	.....	14.70	1000
October 1	883.5	116.5	1043.4	.....	.....	.....	13.10	1000
October 12	842.1	157.9	1053.6	.....	.....	.....	13.70	1000

THE URINE.

DATE.	Water.	Solids.	Specific gravity.	Albumen.	Salts.	Bile.	Reaction.	Total.
.....	.....	....	1028.0	none	.....	none	.....	1000
Sept... 9	932.5	67.5	1027.0	42.90	5.9	none	alkaline	1000
Sept... 11	974.5	25.5	1014.0	7.90	2.7	none	alkaline	1000
Oct.... 11	953.5	46.5	1030.1	0.06	0.7	none	.....	1000

THE LIVER.

DATE.	Water.	Solids.	Fats.	Salts.	Total.	Remarks.
October 11	740.5	259.5	62.5	41.1	1000	.....
October 11	766.8	233.2	66.1	.....	1000	Large lobe.
October 11	773.1	226.9	90.1	.....	1000	Small lobe.
October 23	707.1	292.9	88.6	.....	1000	.....

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VII. TITLES AND DESCRIPTION OF PLATES.

PLATE I.

Appearance of animals in the acute or obvious stage of the Texas cattle disease.

Fig. 1. Showing the feeble animal supporting himself by locking his horns in a fence; back arched, hind legs wide apart, throwing the weight of the body forward, tail retracted, and ears drooping.

Figs. 2 and 3. Showing the drooping head, protruded tongue, arched back and yielding hind-quarters.

Fig. 4. The fallen animal in the last stages of the disease preventing himself from rolling on his side, by twisting his head spasmodically in the opposite direction.

PLATE II.

Carcass of a bullock in the last stage of the Texas cattle disease laid open, in order to show the color of the muscular and adipose tissues. [This is a sketch of one of Mr. Thomas' herd from Indiana.]

PLATE III.

Sections of mucous membrane of *abomasum*, showing ulceration and intense congestion.

Fig. 1. Pyloric portion of *abomasum* showing erosions of the surface covered with blood, blackened by the action of the secretions of the stomach.

Fig. 2. Section of a folding portion of another rennet stomach, showing a more chronic ulceration, and a higher grade of surrounding inflammation.

Fig. 3. Folding portion of *abomasum* showing chronic erosions and intense congestion.

These three figures are taken from Texas cattle.

PLATE IV.

Omasum and abomasum showing slight congestion of the layers of the former, and intense inflammation of the folds of the latter.

a, Omasum; *b*, layers or maniplies; *c*, abomasum; *d*, small intestine.

PLATE V.

Pyloric portion of abomasum and commencement of small intestine, showing inflammation and ulceration of mucous membrane of the former.

PLATE VI.

Sections of pyloric portion of *abomasum*, showing congestion and ulceration.

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Plate VII.

The fourth stomach, showing congestion and deep blackened erosions.

Plate VIII.

Accidental ulcer of upper lip and portion of rectum

Fig. 1. *a*, Ulcer of upper lip; *b*, *b*, *rami* of lower jaw.

Fig. 2. *a*, Mucous membrane of rectum, its longitudinal folds inflamed and covered with minute extravasations; *b*, *b*, adipose tissue.

Plate IX.

Mucous membrane of cœcum and sections of abomasum showing hypertrophy of the follicles.

Fig. 1. Mucous membrane of cœcum, presenting patches and striations of congestion and extravasation of blood.

Figs. 2 and 3. Sections of mucous membrane of folds of abomasum showing the closed follicles enlarged and prominent on a surface of congestion.

Plate X.

Bladder everted, mucous membrane covered with petechiæ and extravasations. *a*, Urethral portion inflammed and œdematous; *b*, fundus marked by deeper congestion and larger extravasations.

Plate XI.

Sections of inflamed duodenum and rectum.

Fig. 1. Mucous membrane of duodenum intensely congested and œdematous.

Fig. 2. Mucous membrane of rectum intensely inflamed, its longitudinal rugæ œdematous commencing gangrene.

Plate XII.

Sections of mucous membrane of abomasum inflamed, and recovering from sloughs, &c.

Fig. 1. Mucous membrane inflamed and covered with blood that has been extravasated upon the surface, and blackened by the gastric secretions.

Fig. 2. Mucous membrane of abomasum of a Texan highly inflamed, the edges of its folds sloughed and thickened.

Plate XIII.

Pyloric portion of abomasum showing extensive slough.

Plate XIV.

Sections of mucous membrane of ileum, showing congestion of longitudinal and tranverse folds.

Plate XV.

Mucous membrane of omasum, abomasum and bladder; intense congestion and petechial extravasation.

Fig. 1. Mucous membrane of omasum, with ecchymosis and papillary projections.

Figs. 2, 3 and 4. Mucous membrane of small intestine reddened by congestion.

Fig. 5. Bladder in miniature, showing petechiæ on a ground of diffused congestion and extravasation. *a*, Urethra.

Fig. 6. Mucous membrane of No. 5, on natural scale, appearance of petechiæ.

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PLATE XVI.

Posterior surface of liver and gall bladder (reduced in size), showing distended gall bladder.

PLATE XVII.

Appearance of enlarged and distorted liver; diaphragmatic surface (weight 3 pounds.

a, Section showing color of parenchyma immediately upon being cut.

PLATE XVIII.

Spleen entire, reduced, and sections.

Fig. 1. Spleen (reduced) showing the mottled greenish color of the peritoneal surface.

Fig. 2. Section of spleen (natural scale) and actual appearance of the surface.

Fig. 3. Portion of spleen of another animal, showing congestion of capsule, and gashed to show the pulp.

PLATE XIX.

Kidney laid open, in order to disclose the interior congestion and discoloration, and showing cortical portion, tubular portion, and pelvis with surrounding fat; all these parts blackened and intense congestion.

PLATE XX.

Kidneys entire (reduced) in different stages of congestion.

Fig. 1. Same animal as Plate XVII.

PLATE XXI.

Section of pyloric portion of abomasum, several weeks convalescent, and of rectum, showing congestion and ulceration.

PLATE XXII.

A congested and ulcerated abomasum.

PLATE XXIII.

Sections of skin, liver and spleen.

Fig. 1. Portion of skin shaved, in order to show its jaundiced hue.

Fig. 2. Fragment of liver showing color of surface, and the ramifications of the distended biliary ducts.

Fig. 3. Portion of spleen showing congestion of superficial blood vessels and coloration of parenchyma.

Plates illustrating the microscopical researches, seven in number, already described. Plate XXXII illustrates Prof. Hallier's study of the fungus parasite of the blood and bile in the cattle disease.

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VIII. WITH WHAT WELL DESCRIBED DISEASES IS THIS TEXAS CATTLE DISEASE ALLIED?

Having alluded to the fact that the first groups of the diseased animals that arrived at the Metropolitan herd yards exhibited symptoms which led us to believe that the malady perhaps belonged to the brood of contagions known as *anthrax* fevers, some pains have been taken to inquire carefully into its chief points of resemblance and difference, compared with those fevers, and with the milzbrand and kindred disorders which prevail on the continent of Europe.

The very first dissections that were made clearly demonstrated that it was not the intestinal typhus, for the small intestines were in no cases marked by any of the lesions of typhoid enteritis which is prevalent in the lowlands of Holland, Belgium and Hungary. Considered in regard to all the phenomena and pathological changes noticed in the first two groups of diseased cattle, this disease seemed to require a description that had hitherto not been given in any treatise on epizoötics. From the Western newspapers the fact was learned, that Prof. Gamgee and others regarded it as similar to the "darn" of Aberdeenshire. Prof. Liautard, with whom we frequently conferred during the autumn, did not attempt to give any name to the disease. The same was true of Prof. James Law, the accomplished professor of veterinary science at the Cornell University, Ithaca, N. Y., whose attendance we had the good fortune to secure at one of the last post mortem examinations made at the National drove yards, One Hundredth street. The latter gentleman has, with characteristic thoughtfulness, kindly forwarded to us the subjoined communication relating to the points we are here examining:

* * * * * *

The "darn" as seen by us in Great Britain [Prof. Law is a native of Scotland] is usually a very mild affection. Its cause is agreed on all hands to be the ingestion of irritant, resinous and astringent plants, as its common names—in England,

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wood-evil; in Germany, *holzkrankheit;* and in France, *maladie de bois*—would indicate. The symptoms are those of intestinal irritation, the colicy pains being often severe, with constipation; the fæces, if passed, being coated with mucus or even blood, and in bad cases forming a tarry mass evidently due to altered and effused blood The urine, red or black, contains large quantities of blood-coloring matter and albumen.

If seen in the early stages, measures directed to the obtaining of free evacuations from the bowels are almost always followed by a speedy restoration to health, so that I have never seen a fatal case.

It is worthy of note, that it often prevails on the same lands with the *anthrax* or *carbuncular* affections, and appears then to be complicated by this disease, or modified by a similar cause. Röll, of Vienna, says there will sometimes appear "a gelatinous exudation into the sub-cutaneous areolar tissue, and extravasation beneath the serous membranes, showing a complication with anthrax. The malady begins with the appearance of gastro-enteritis, accompanied by renal irritation, scanty, red or bloody urine, great sensibility of the loins and intense fever, mucous and bloody fæces, fœtid and bitter milk, with not unfrequently spasms or convulsions. The complication with splenic apoplexy (milzbrand) is seen, and may be shown by swelling and emphysema on the surface of the body."

Hering and others speak in analogous terms, indicating its close connection with the anthrax affections, though whether only as a complication or a full development of the original affection, is open to question. Our English form rarely assumes this aggravated type, and seems quite wanting in the malignant properties of carbuncular fevers, having, moreover, no specific virus like these latter. I ought to add, however, that in those European cases that prove so fatal, the autopsy shows points of resemblance to the Texas fever. Hering says there is "inflammation and petechial patches in the stomach and intestines, the ingesta is dried, the mucous membrane œdematous, the liver and spleen enlarged, sometimes even to rupture; the gall bladder distended, the kidneys contracted, a turbid effusion in the thorax, inflammation and petechiæ in the pulmonary organs, and a jelly-like effusion into the cellular tissue."

The accounts, however, are too meagre, and as you will notice, the means available in the present day have not been brought into requisition in the case of these diseases, so as to furnish data sufficiently numerous and accurate for purposes of comparison.

I have already mentioned to you the general similarity of the Texas fever and the *carbuncular fevers* of Europe. I mentioned that one great distinguishing feature of the former was the absence of *bacteria* in the blood, though as these have been found in the blood of animals suffering from influenza and other affections, attended with a typhus diathesis, their presence is probably not an essential condition of the disease. What leads me to make special reference to this again, is the statement by *Davaino*, in his communication read before the *Academie de Medicine* (July 27th, 1860), that in addition to bacteria, the blood of anthrax patients contained special globular elements. "Globules, of a peculiar kind, are sometimes found; they are regularly rounded off, and larger than the normal white globules, of which they have the appearance. They are united in small clusters in great abundance, and are composed of an outer cell of a bulbous appearance, reflecting in some a violet tint. In the center of this cell there are found several nuclei, the double outline of which is well marked. In some, these nuclei have degenerated into the sandy or granulous form, peculiar to the nuclei which are pre-

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duced by *fission*, so that evidently we have under our eye an alteration of the elements, *which are in a fair way of multiplication.*"

This spore cell production I had altogether overlooked; but now the question arises: May not this be the same microphyte as you have so admirably shown in the blood of *Texas fever*, or, what would probably amount to much the same thing, a fungus, which demands much the same condition of blood for its development? The want of any testimony to its presence in the bile, and the ignorance concerning the special action of the bile in breaking up the blood globules, affords no presumptive evidence of the non-existence of these conditions, since the presumption is that *no test was applied.*

In contagious properties, again, they agree in some remarkable points. The carbuncular fevers are inoculable, and usually contagious, but the contagium is rarely or never conveyed through any other medium than the blood, tissues and discharges of the diseased animals—rarely showing what the French call a *virus volatil*—and evidently requiring some, not well defined conditions, for its transmission; hence, in many cases—indeed, the majority of cases in Great Britain—it gives no evidence of a *contagium* unless inoculation is resorted to. * * *

With much esteem,

Yours very faithfully,

(Signed) JAMES LAW.

To E. HARRIS, M. D., *Metropolitan Board of Health.*

Plainly enough, it will be easy for European medical observers of milzbrand, and the whole group of anthracoid diseases of cattle, to ascertain whether these destructive maladies which they witness are or are not similar to the Texas cattle disease. Prof. Virchow, of Berlin, Dr. William Budd, of Bristol, and the ablest pathologists in Europe, think they are able to trace a direct relation between the carbuncular or anthracoid fevers of domestic cattle and the malignant pustule in man. Such a relation is now admitted to be the source of this terribly fatal malady. But in reference to the Texas cattle disease, the fact seems well established that it does not produce malignant pustule, and that while it corresponds with the destructive epizoötic fevers which Professor Law has carefully described in the foregoing letter, it nevertheless seems to differ in some essential points from them. It is highly desirable that all the anthracic or carbuncular fevers should be studied with the same care and exactness as the Texas fever. Professor Law's statement concerning the actual analogy between the milzbrand, of Europe, and the Texas fever, are eminently suggestive; and we feel greatly obliged to that learned writer for this valuable contribution from his pen. It may yet be found that the marshes of Hungary and the swamps of the Vistula occasionally produce a disease quite similar to the Texas cattle fever.

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IX. FACTS AND DEMONSTRATIONS ADDED TO PHYSIOLOGICAL AND PATHOLOGICAL KNOWLEDGE.

FIRST.—*The demonstration of the rapid dissolution of the red blood-globules in the last stage of the disease and immediately after death.* This was plainly true in the first cases examined by Dr. Stiles; and on the 10th of August, he remarked that after the blood, flowing from the carotids of infected bullocks, had stood for a few hours in stoppered vials, scarcely a trace of blood-globules could be found, excepting such broken and shrivelled as he has described in the first plate of his microscopy of the blood. And, while experimenting with a solution of the morbid bile from the same diseased bullocks, Dr. Stiles noticed the fact that the red globules of the blood were swept into solution almost as suddenly as snow flakes would be when falling into water.

SECOND.—*Facts connected with the ultimate reticulum of biliary ducts and the morbid changes in the liver and bile.* The discovery that was made by Dr. Stiles (when working in the field with the microscope, on the 13th of August), of the reticulated structure and distribution of the ultimate biliary ducts of the liver, not only added a fact of great interest and importance in progressive physiological knowledge, but this discovery was from the first associated with pathological conditions, the later studies and better understanding of which have led to comprehensive, exact and highly important practical conclusions in regard to symptoms and pathological changes which had hitherto been most important, but at the same time most difficult, if not impossible, to understand. We refer to the mechanical and pathological conditions which in this disease manifestly produce cholæmia, and to certain demonstrations, here alluded to concerning the morbid condition and destructive effects of the bile as witnessed in this disease. The studies which Frerichs and other high authorities have given to this class of facts without such means of demonstrations, have been corroborated

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and placed upon a more definite practical footing by the results of these researches.

THIRD.—*The demonstration of consecutive pathological changes, and of their relations to the fatal result.* No other pestilential or febrile disease, whether epidemic or epizoötic, has furnished to medical observers such a complete and consecutive series of demonstrations of the steps by which disease progresses from its incubative beginnings to perilous and destructive changes in tissues and proximate elements to obvious symptoms and exclusive phenomena, until death terminates the pathological record of events. Considered with reference to the progress of medical knowledge and hygienic measures, in regard to epizoötics and enzoötics, as well as in regard to epidemics and certain of the spreading pestilences that depend upon contingent circumstances that hitherto have not been well demonstrated, the results reached in these investigations may justly be regarded as in the highest degree encouraging and instructive. The successful study of the essential morbid changes that occur during the progress of this disease in the blood, the bile, the liver, the most vascular and constricted portion of the stomach and the spleen, and lastly, the explosive phenomena, the destruction of the blood-corpuscles, the waste of blood elements of the kidneys, and the morbid alterations that occur in those organs, and in conclusion, the phenomena and circumstances of death, together with that impressive and truth-telling signet which the damaged and broken blood-corpuscles leave in the tissues, cavities and fluids into which the spoiled and stagnant blood has oozed and left crystals of hæmatoidine, singly, and in this association, constitute such a series of consecutive and well coördinated events in the disease as rarely has rewarded the toil of medical researches. And notwithstanding more remains to be learned than all that hitherto has been demonstrated, it is certain that some substantial progress has been made in that kind of knowledge by which the mysteries of transportable pestilences will ere long be unmasked and exterminated or effectually controlled. And when we consider that, had it been a human pestilence, this disease could not have been studied in this manner without violating the common sentiment of regard for the dying and the dead, the medical men who pursue such investigations upon the food-animals, may justly claim that by such studies as these they confer a three-fold benefit upon mankind; for in addition to the protection of human foods

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and myriads of valuable cattle, a correct and controlling knowledge of human pestilences is promoted, as it could be in no other way.

FOURTH.—*The re-demonstration of the same law of ground-incubation, or development of a contagium deposited upon the soil from the bowels.* This very important law or truth concerning certain infective principles or substances was first demonstrated by Prof. Pettenkofer, of Munich; and the demonstration, as the Metropolitan Board of Health very well knows, related to the propagating principle of the Asiatic cholera. Dr. Wm. Budd and Dr. Snow, in England, practically taught this doctrine, without full demonstrations, at the same time that Pettenkofer was tracing out the complete evidence upon which this law is now founded. As in regard to the infective cause of cholera, so in regard to the Texas cattle disease, the bowels of the living, and in some instances apparently healthy, individual *carrier* of the pestilential germs, may evacuate—with excrement, those germs so completely developed that they may at once begin the fatal and incubative work of infecting other individuals; or, on the other hand, the germ development in such excrement may be so incomplete or immature ("unripe," as Professor Hallier says of the anærophytic spores), that the surface of the soil, or the herbage on which the excrement is dropped, must serve as the nursery and "hot-bed" for nourishing them into the advanced or infective and poisonous stage of development (the "ripe" state, Prof. Hallier), before the blood and tissues of the exposed and healthy individuals can become infected. In the present state of advancing demonstrations in regard to the pestilential *contagium* of cholera, this would scarcely be regarded as theoretical language, much less does it now seem to be merely theoretical in regard to the Texas cattle disease. Upon this subject we need only refer to the abstract of correspondence and of authenticated evidence in prceeding sections of this report. In the States of Illinois and Indiana, the proofs upon this point concerning the incubation or maturing of the excrement contagium during an interval of greater or less duration after it was dropped upon the ground, are so abundant and convincing, that many of the farmers seized upon the logical interpretation of their own peculiar experience and classes, and emphatically though somewhat rudely gave expression to this wonderful yet now easily understood doctrine, that Pettenkofer demonstrated when analyzing the history of cholera in Bavaria in the autumn of 1848. A vast quantity of evidence (experience and record) relating to this anomalous habit of the infective cause of

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the Texas cattle disease, is constantly coming into our hands, and it will in due time be analyzed and the results made public.

FIFTH—*Aid in elucidating important physiological and pathological questions connected with yellow fever.* While summing up and analyzing the results of these investigations concerning the "Texas cattle disease," we have been deeply interested in the contribution which these results make to practical knowledge of some of the most essential questions that have, in the past fifteen years, been started by physicians in the study of yellow fever. The compiler of this report having witnessed and professionally examined several hundred cases of this pestilence, and made dissections of nearly one hundred persons that died of it, was prepared to notice the points at which the results of the present investigations apply to the questions that have arisen in the study of yellow fever. In regard to these questions we will here notice the following points:

In 1853, Prof. Alonzo Clark, of New York, discovered and described the characteristics of the fatty change and the peculiar coloration that occur in the liver in cases of yellow fever. He also described the nature and cause of the strange coloration which characterizes the liver in malignant remittent fever. Dr. T. H. Bache and Dr. Stewardson, of Philadelphia, made similar researches and reached similar results. The microscopical investigations by Dr. Lyon in the last epidemic of yellow fever in Lisbon, and similar studies by Dr. S. Fleet Speir, of Brooklyn, confirmed the medical opinion of the profession that the most constant of any of the anatomical changes in the latter malady, is found in the liver, and in a certain kind of coloration which attends the malady as a resultant of the dissolution of blood globules. Whoever peruses this report, should, if possible, read the Prize Essay of Dr. Speir in the Transactions of the American Medical Association (vol. xv, 1864), and consult the letter from Prof. Clark in the first volume of Dr. La Roche, on yellow fever, and the report on yellow fever in Lisbon in 1858, by Dr. Robert Lyon. These distinguished pathologists found that the pestilential destruction of blood-globules, the presence of the resulting *hæmatoidine*, or of hæmatine, from which it is derived, and the acute fatty change in the ultimate structure of the liver, are the most essential pathological events in that malady. But the opportunity for studying the structural (morphological) alterations in the liver, the blood, the spleen and the kidneys in fatal cases of yellow fever, have not given the facilities for precision in results of microscopical inquiry (because

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not made in every stage of the disease and of convalescence, and before any *post mortem* change was possible) which have been afforded by the infected cattle for the examination of these vital structures. And it is one of the rewards of the latter class of labors that they elucidate and verify the chief deductions that have been made by the learned physicians whose researches in yellow fever are here mentioned.

In concluding this brief note upon the aid given to clearer demonstrations in pathology by these investigations, we would not omit to notice the very instructive researches of the late Dr. Daniel Blair, chief medical officer of the British military establishment in Demerara; for when he died in the midst of great efforts to discover the true cause of yellow fever, sanitary science lost its most ardent inquirer into the natural causes of this pestilence. The latest of his observations was so directly in the line of the demonstrations that have resulted from Dr. Stiles' investigations that we mention them in this place. Truly, scientific physicians are jealous only for the truth; and it will be noticed that Dr. Blair reached the verge of that important discovery which Dr. Stiles has made in regard to the actual ultimate structure of the biliary system. It was in a living patient in his hospital, and in some vomited bilious and bloody matter which Dr. Blair believed contained by chance some particles from the diseased liver cells that had floated into the duodenum and into the stomach with the bile. In April, 1856, Dr. Blair wrote to his friend, Dr. John Davy, of London, as follows concerning his microscopical examination of that fancied and but barely possible presence of debris of the liver:

> It (nitric acid, upon a certain specimen) enabled me to trace some of the tubules into the *centre of the specimen;* still more important, it enabled me to detect within them liver-cells, with their minute oil globules. * * * I think there can be little doubt that these tubules are the *radical* secreting *ducts of the liver*. May not these observations throw some light upon what I believe is still an undecided point in anatomy, viz., the precise manner in which the radicals originate in the lobules? To me, what I have seen seems a demonstration of the induction of Kiernan on this point.

Dr. Blair was describing a substance that his patient had ejected with some bile or vomit, and this observation came near being buried with its author. It was not a demonstration; nor would a thousand such observations have been a worthy basis for belief or assertion; but it has value as an observation, that we mention this fact here, because it belongs to the record of a most important dis-

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covery and actual demonstration of essential facts in the anatomy and pathology of the liver, and particularly because this curious observation by Dr. Blair shows how difficult and obscure was the kind of knowledge which he sought by the bed of the dying and in the corpse of dead of yellow fever. (For a fuller account of Dr. Blair's latest observations, see his letters appended to the April and July numbers of the *Medico Chirurgical Review*, 1856.)

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X. CONCLUSIONS.

The field in which the investigations have been commenced is too large to admit of final conclusions upon *all* the points of inquiry, in so brief a period, for analyzing the results of so numerous and varied an assemblage of facts. Our deductions, therefore, must be regarded rather as landmarks and soundings, than as boundary lines, upon the shore of great truths. The conclusions that appear best established have important relations to practical questions in hygiene and to the interests of herd farmers.

FIRST.—*The nature and pathological effects of the disease in beef cattle.* The investigations prove that the disease is caused by a slowly incubating poison which operates in a fatal way upon the blood, and which also produces important structural alterations in the essential organization of the liver, the spleen, and the kidneys.

SECOND.—*The precise nature of the diseased structural alterations.* The blood suffers an impairment, and, in the fatal stage, an almost entire destruction of its most vital portion—the red globules. It also suffers in its natural quality and richness, by the loss of albumen through the kidneys, and by other very serious kinds of impairment which are not yet understood, but which result in actual destruction of the blood as a living element of the animal system. This spoliation and death of the blood (*necræmia*) appears to be complete. No disease or poison known to medical men has ever presented a more striking example of an incubating blood-poison (*toxæmia*), and an ultimate termination by necræmia or death of the blood.

The *anatomical lesions*, or structural alterations in the liver, are unquestionably the first in the order of beginning, and of relationship and importance. The particular kind of morbid conditions in the secreting and circulatory organism of the liver would inevitably contribute to the gradual and final destruction of the blood, and also would induce the morbid changes that are observed in

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the spleen. Physiological principles seem fully to account for the engorgement, erosion and sloughing which occur in the tubular portion of the fourth stomach or abomasum. The spleen, in its engorged, diseased condition, would necessarily aid in producing the stomach lesion (erosion and sloughing) by its own failure to furnish outlet and relief to the engorgement of the vessels of mucous membrane of the rennet, and it could contribute in several ways to hasten the final dissolution of the blood. The engorgement and the acute fatty degeneration or change noticed in the kidneys, is one of the chief causes of the rapid waste of albumen from the blood; but the disease may, and not unfrequently does, go on to a fatal termination without being attended by any considerable amount of disease or change in the kidneys. The lesions or changes that have been observed in the other tissues and organs of the infected animals seem to be merely results of blood-changes and impaired vitality. Those lesions which are merely incidental to the really essential changes in the blood and in the liver and spleen, may, nevertheless, be recognized as aids in diagnosis of the disease in certain cases. They are, therefore, worthy of attention and description, such as we have attempted to give in several of the illustrations given in this report.

THIRD.—*The parasite that is found in the blood and bile of infected cattle.* Whether we regard it as a propagating and destructive cause of the disease, or simply as a concomitant, it is necessarily an important attribute of the pathological or destructive agency that operates upon the blood. The prolific brooding and growth of the fungus (micrococcus) is wholly dependent upon the living elements of the blood for its "soil and food" to grow upon. But the real significance and value of the results that have been reached in the researches upon this collateral element of the inquiry into the disease, promise much for practical hygiene as well as for herd farming; for, such complete demonstrations will lead to a kind of absolute knowledge that is much needed concerning the pestilential epidemics, as well as the destructive epizoötics, and will lead to their *entire prevention.*

FOURTH.—*The unfitness of the dying and the infected cattle for human food.* If this question is raised by any persons, or on behalf of any commercial interest, it should at once be answered in general terms, that both the animals that are dying, and those that have lingered under the operation of the infection until the blood and viscera are diseased, are unfit for food. Practically the human

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stomach can overcome most of the immediately poisonous effects of diseased flesh and animal juices used as food; but experience and teachings of physiology and hygiene unite in pronouncing unfit for food, all the cattle that reach the fatal stage of the "Texas cattle disease," and all that have incubated the infection until the blood and tissues exhibit the morbid alterations which that poison produces. And as regards *certain freshly arrived Texas cattle* that are suffering the disease (as we now diagnosticate it by the *post mortem* evidences in them when slaughtered, and by emaciation, feebleness and their indescribably offensive breath and effluvium while living), we can best express the conclusion that has been reached by the more precise kind of investigation, without here mentioning the details of evidence on this subject, by simply quoting the remark of an educated observer of the Texas cattle disease in Western Missouri. He says: "Who would knowingly eat the beef of cattle with such a pestiferous breath as these sick Texas cattle have? It can be no favor to the consumers of beef to have that article cheapened in the market by the introduction of such very doubtful, not to say injurious character." In plain words, cattle while suffering either from the chronic or the acute type of this disease ought to be withheld from the meat markets.

FIFTH.—*The period or term of incubation.* The term of incubation or latent development of the fever poison in the second or northern groups of cattle that receive the infection, is clearly proved to be a period of variable duration, and that it varies from fourteen to thirty or forty days; but, that in the majority of instances, the full incubation and development of the disease is accomplished in about twenty days.* High temperature manifestly hastens the development of the disease. And the hunger, thirst and excitement of railway transportation aggravates it. But that even where the cattle become infected in good pasture, and under circumstances

* This is a little more than four times the average and usual period of incubation of yellow fever in man. The troops that continued to be sent from France to the port of Vera Cruz during the recent occupation of Mexico by the French, were attacked by yellow fever under such exact conditions and periods of exposure by medical observation at the times of their arrival in port, that the medical officers had no difficulty in reaching the conclusion that the period of incubation of the infection (contagium) "was never less than forty-eight hours, and seldom more than four days." (Surgeon M. Crouillebois on *Epidemic Yellow Fever at Vera Cruz* in 1863. Recueil de Mémoirs de Médicine, de Chirurgie et de Pharmacie Militaire, Paris, December, 1868.) This result of observations by the French military surgeons, accords with observations upon the same pestilence in the harbor quarantine hospitals of New York, with this exception, that *in this latitude* we find that the period of incubation ranges from three to seven days, and that in cool weather the incubation term is longer than in very hot weather.

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that are favorable to the best health, the incubation is certain and destructive; and, that with such conditions, it requires four weeks, less or more, to bring the malady forward to its stage of obvious symptoms and death.

SIXTH.—*The susceptibility of different kinds of cattle.* The fact seems well established that well bred and full fleshed cattle are extremely susceptible to the operation of the contagium, and that in them its highest rate of mortality is produced. The fact also is indisputable that in the herds that have the misfortune to bring the disease or *contagium* from Texas, only a small percentage become fatally sick; but in such herds many that do not die of the disease linger many weeks in an emaciated and diseased condition.

SEVENTH.—*Acclimatization and insusceptibility to the cause of the disease.* This kind of security seems to be enjoyed only by cattle that have been bred or pastured south of the Osage and Arkansas rivers; but whether this partial security against the malady is due to the peculiarities of wild cattle, or to a gradually acquired physiological power to resist the fatal operation of the primary cause of the disease while grazing at its very sources, does not appear to be proved.

EIGHTH.—*Is the disease due to crowding and abuses of cattle?* Plainly, it does not *originate* from such causes; but there is evidence that the Texas cattle that are crowded upon the "boiler deck" of the Mississippi steamboats, and subjected to thirst and fasting on the voyage up the river, have thus far been themselves the greatest sufferers by disease, and have proved to be the most frequent carriers of the cause which last summer destroyed native herds in Illinois and Indiana.

NINTH.—*Susceptibility of other animals than those of the bovine species to the disease.* The fact seems to be well established that several kinds of herbiverous animal do suffer and die from the disease.

TENTH.—*Is the disease of cryptogamic origin?* With the amount and kind of evidence now in our possession, it seems probable that this malady owes its origin to a species of fungus parasite which has now been demonstrated to infest infected cattle; and that this conclusion rests upon other and much stronger reasons than that such a parasite simply *is found* in the blood and bile. It also seems highly probable that the actual *contagium*, or means by which the disease is repropagated by cattle, will ultimately be demonstrated to depend upon this minute spore-growth (*micro-*

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coccus matter, of Professor Hallier), which is found in the dis cattle and upon the higher stages of the development when d ited with the excremental droppings upon the soil, etc. that ultimately it may, and probably will be discovered, t native habitat and source of this parasite is in limited distri country south of Missouri, Kansas and Arkansas; and that parasite of the indigenous herbage of those districts. Upon these points the evidence is cumulative, harmonious and lo yet, in the more advanced state of knowledge concerning causation of this and other infectious diseases, it may be found this or some other essential attribute of the disease and the gium is only an essential factor, the presence of which, with morbid and unhealthful conditions, insures the production a operations of the malady. Finally, in regard to this exact ki discrimination concerning the nature and destructive op of the propagating cause of pestilential diseases, the facts that been demonstrated concerning the Texas cattle disease add largely to a kind of knowledge which is of the highest impor to sanitary science and its protective applications in the h family and to the useful animals which the Creator has giv man.

ELISHA HAR

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Carcass of Bullock.
(killed in the last stage of the disease.)

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Fig 1.

Fig 2.

Fig 3.

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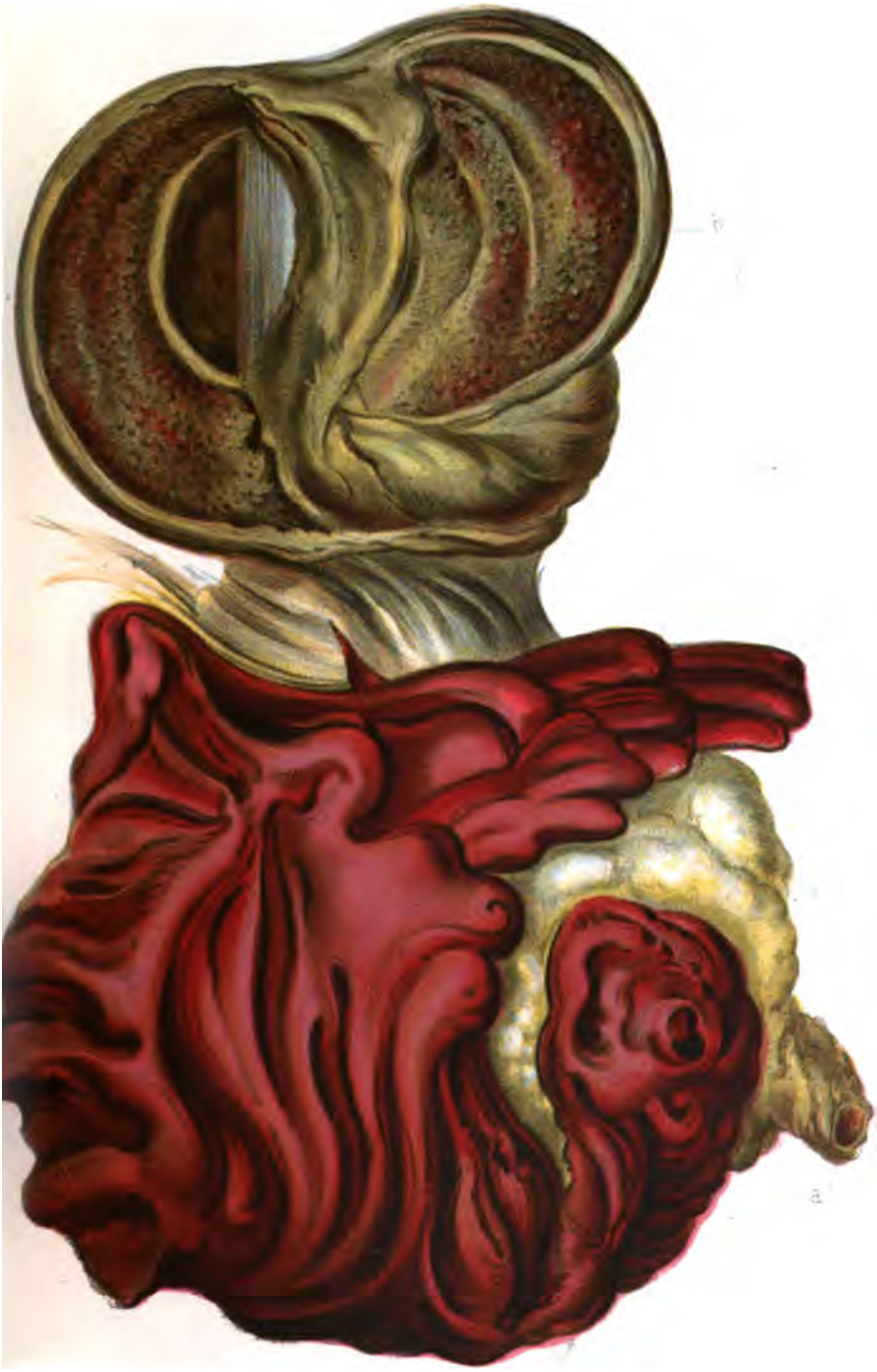

Appearance of 3rd and 4th Stomachs.
in the beginning of the acute stage

See plate I Fig 2

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hler fecit

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R. Kohler, fecit

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Erosions in the Aconitum.

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Plate VIII

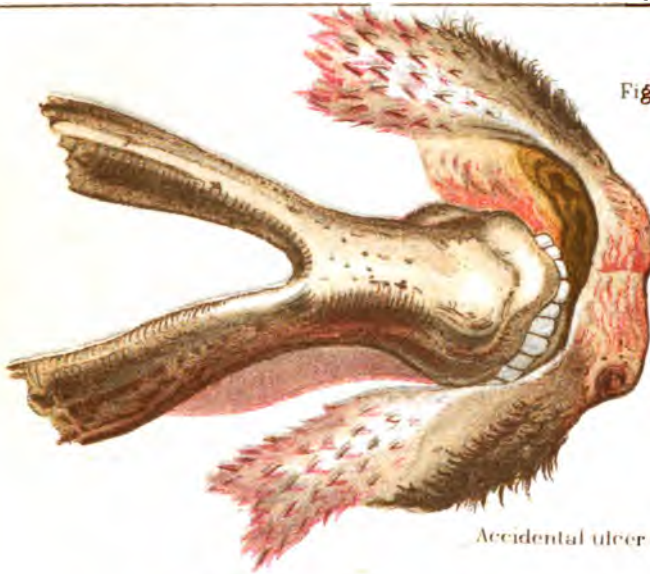

Fig. 1.

Accidental ulcer on lip

Fig. 2

Mucous membrane of rectum

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Fig 1.

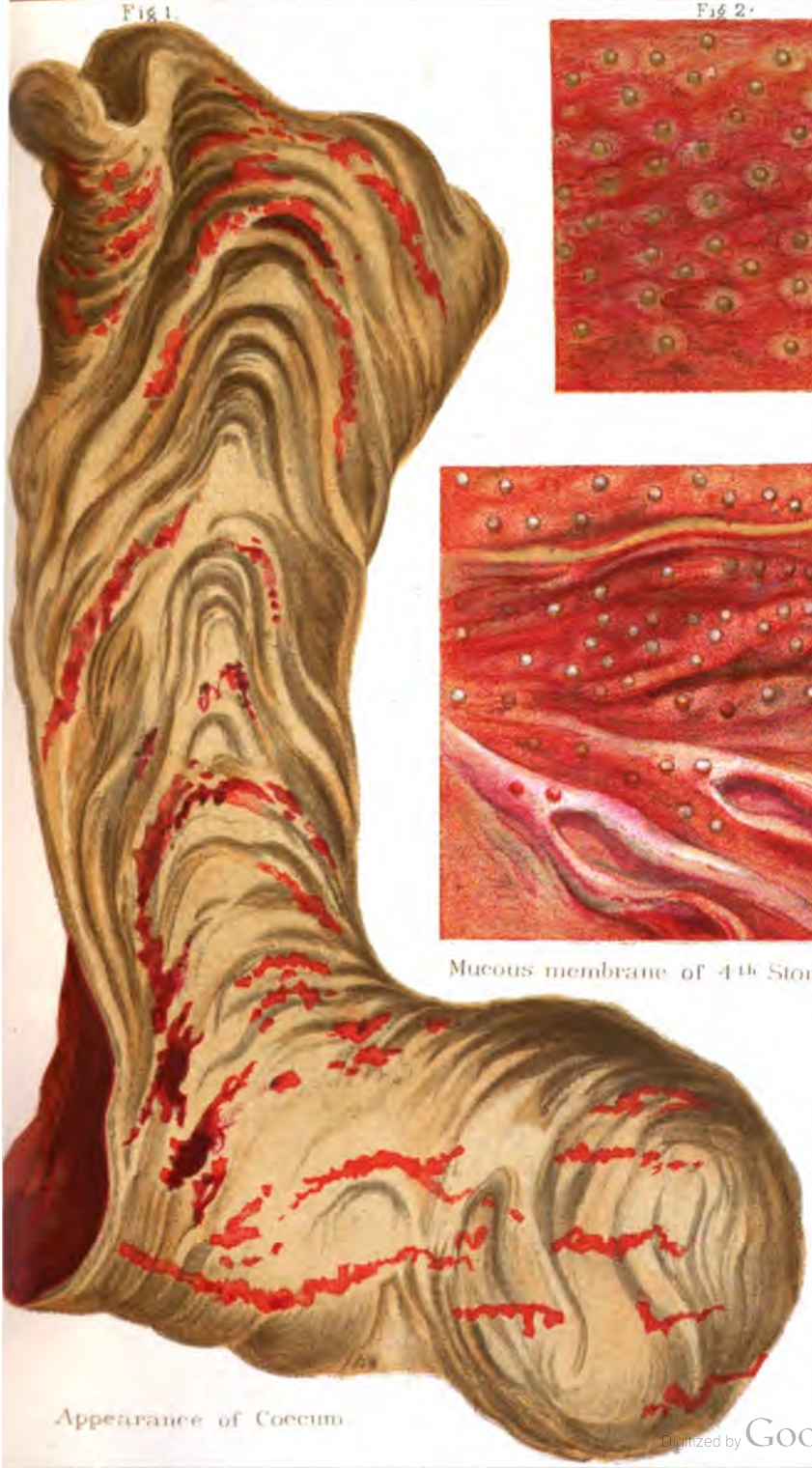

Fig 2.

Mucous membrane of 4th Stomach

Appearance of Coecum

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Plate X
Mucous membrane of bladder.

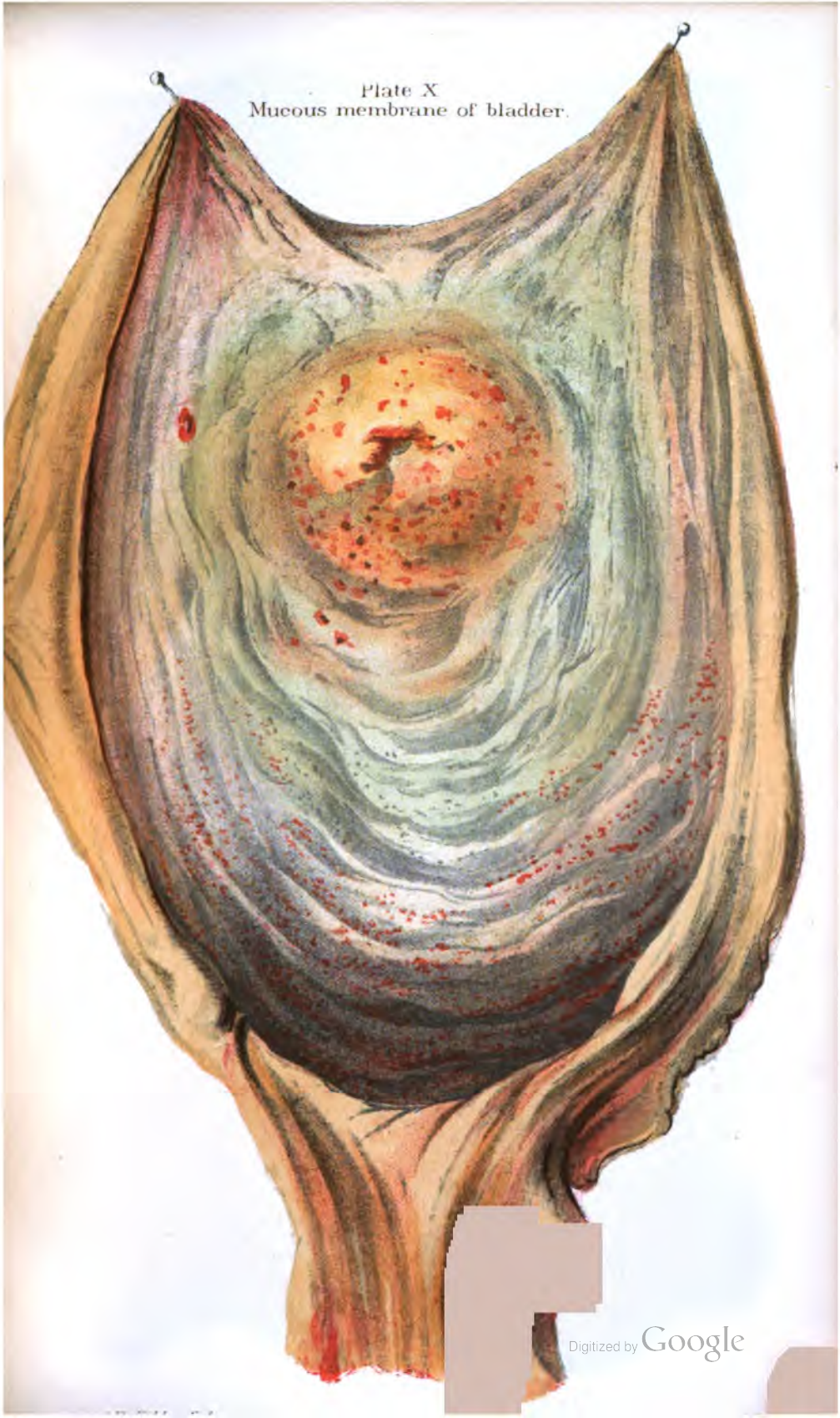

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Fig. 1

Fig. 2

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E. K. Miller fecit

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Appearances of Duodenum and Rectum

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Fig 1.

Fig 2.

P. Koehler, fecit

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Folds of Abomasum.
(Texas Steers)

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Sloughs in Abomasum.
(Fat Ox.)

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ehler fecit

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Fig 1.

Appearance of Coecum.

Fig 2.

Mucous membrane of 4th Stomach.

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Plate X
Mucous membrane of bladder.

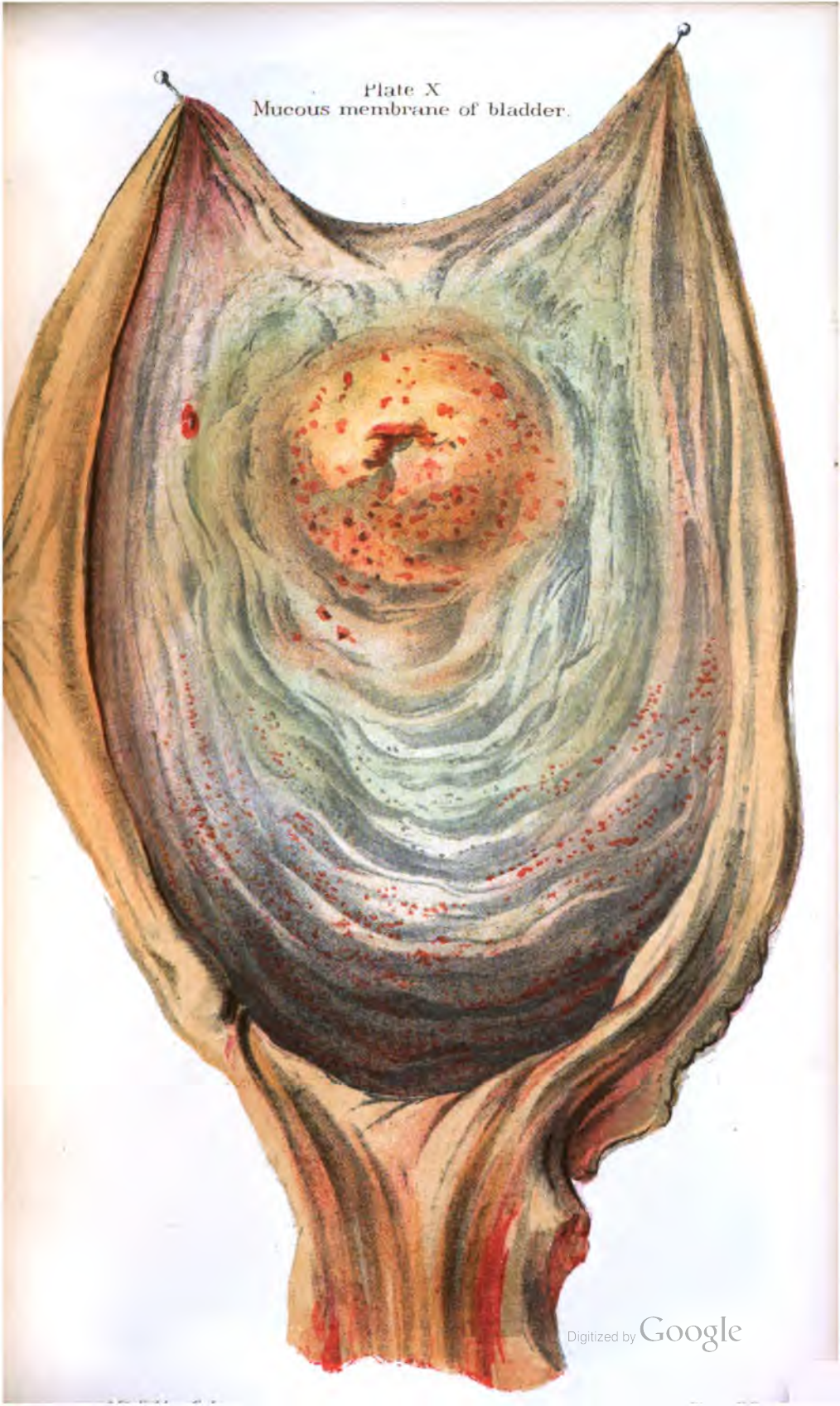

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Fig. 2

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Appearances of Duodenum and Rectum

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Fig. 1.

Fig. 2.

R. Koehler fecit

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Folds of Abomasum.

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Sloughs in Abomasum.
(Fat Ox)

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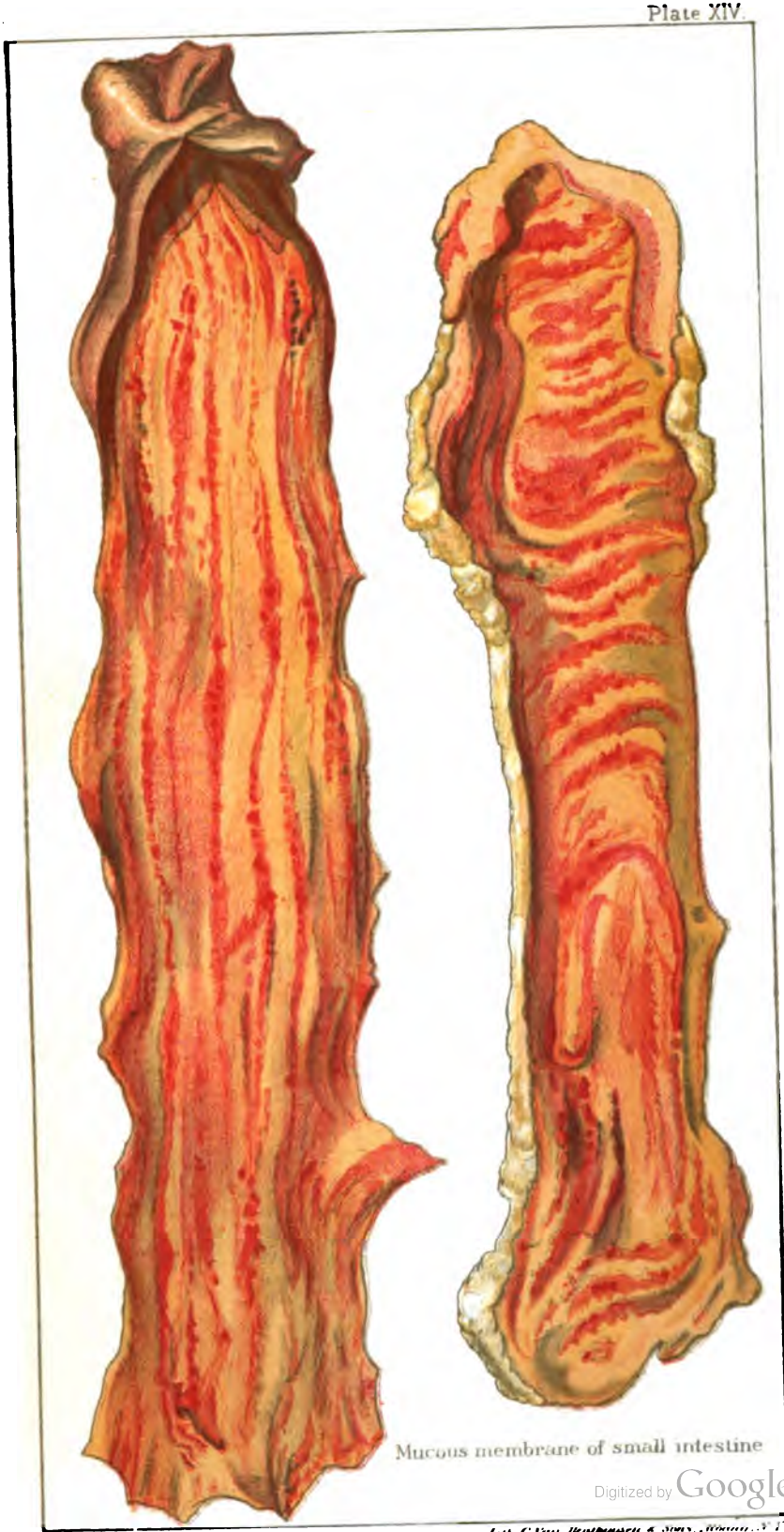
Plate XIV.



Mucous membrane of small intestine

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F. Kohler fecit

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Fig. 1.

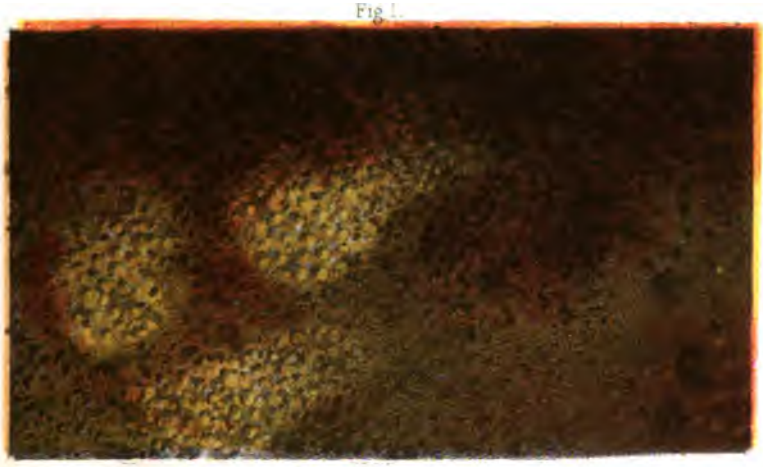

Fig. 2.

Fig. 4.

Fig. 3.

Fig. 5.

Fig. 6.

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Sections of Mucous Membrane.

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Liver and Gall Bladder,
(weight 18½ lbs.)

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R. Koehler fecit

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View of Liver Injured Fat.
(waxy fatty weight [illegible])

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Fig. 2.

Fig. 1.

Fig. 3.

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Kidney laid open.

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Fig 1 Kidney
(same animal as plate 17)

Fig 2 Kidney of convalescent.
(one week convalescent)

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Fig. 2

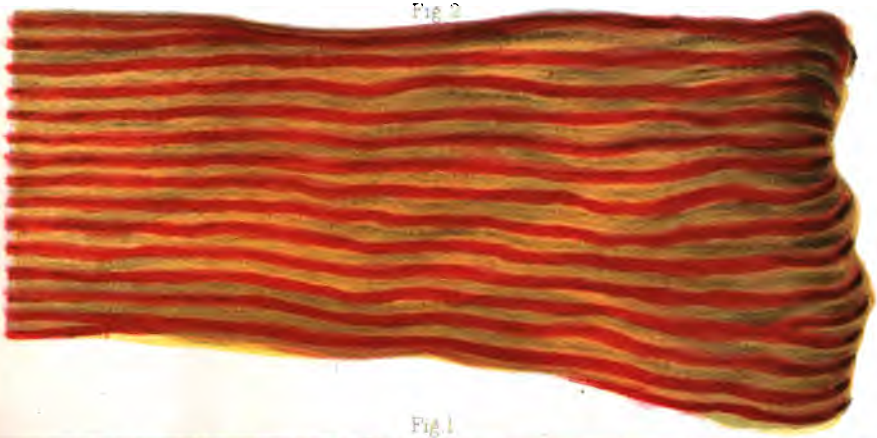

Fig. 1

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Fig. 1. Section of Pyloric portion of Abomasum

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Plate XXII

Abomasum one week convalescent.

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Fig. 2.

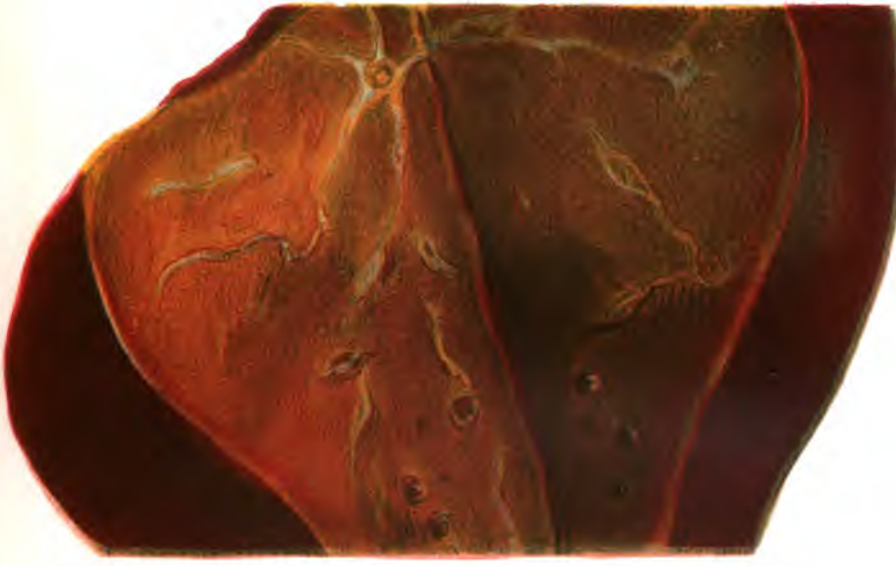
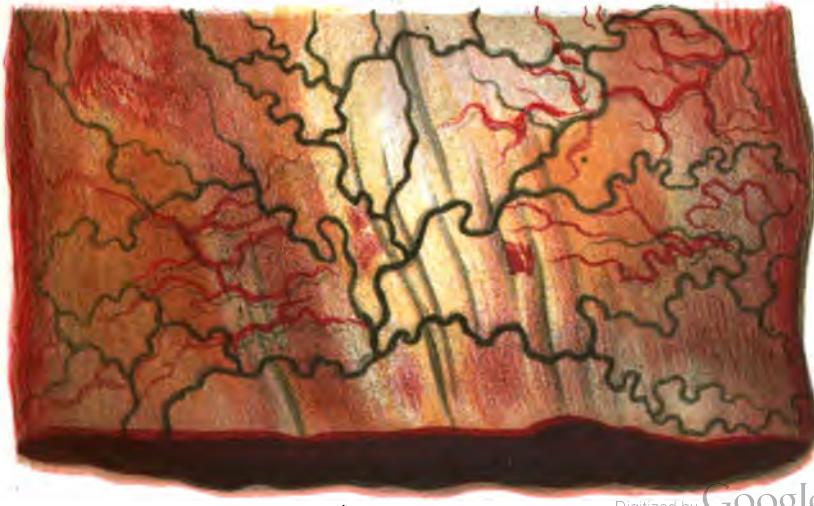


Fig. 3.



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Section of Hide, Liver and Spleen,
in Ox several days after acute stage.

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SPLEEN FROM A DISEASED TEXAN STEER,

that left Texas in June, and was slaughtered in New York in October, 1868, after feeding three months upon the farm of Mr. Alexander, in Illinois. [Gross weight of animal 800 lbs.; weight of Spleen 3 lbs. 8 oz.

SPLEEN FROM A HEALTHY NATIVE BULLOCK,

slaughtered in New-York in October, 1868. [Gross weight of animal 1,000 lbs ; weight of Spleen 1 lb. 10 oz.]

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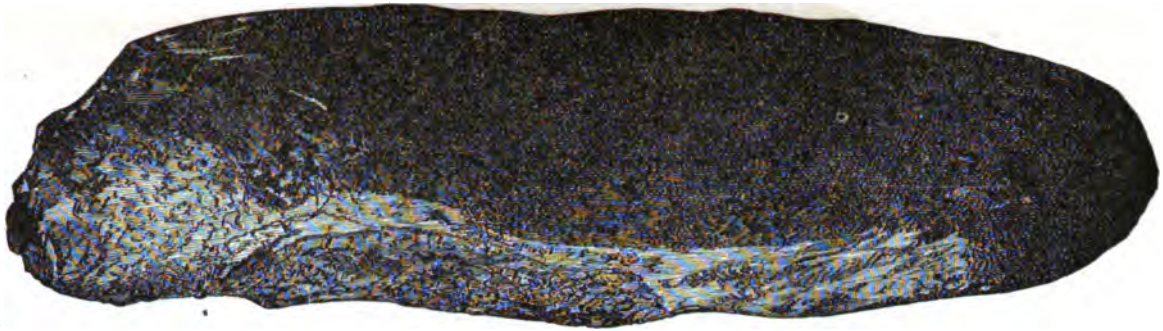
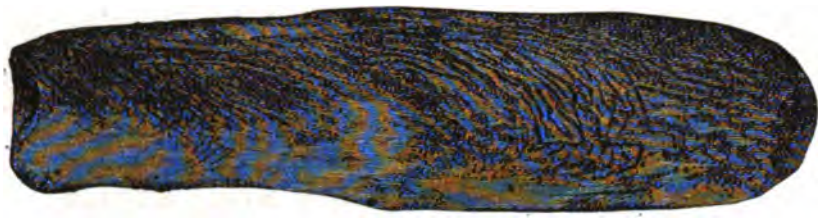
SPLEEN OF A DISEASED TEXAN,

that arrived and was slaughtered at same dates, in Chicago. [Weight of animal 800 lbs.; weight of Spleen 8 lbs.]



SPLEEN OF A STEER THAT WAS SLAUGHTERED IN CHICAGO,

soon after arriving from Texas. [Animal in fair health; weight 800 lbs, Weight of Spleen 2 lbs.]



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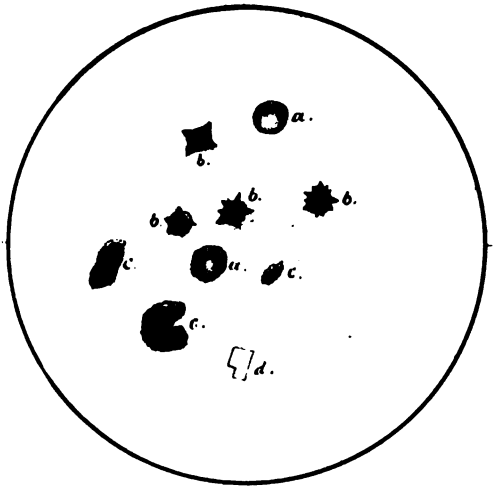
Blood and Bile.

1



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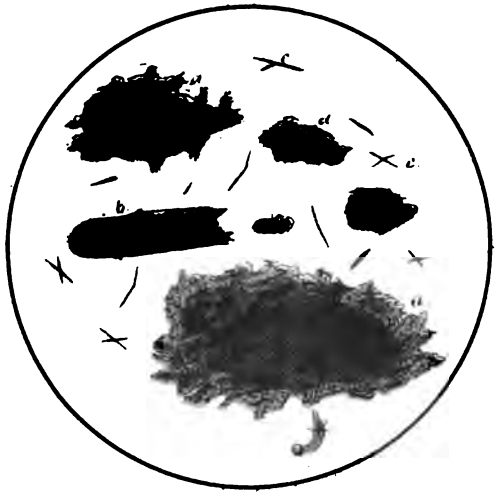

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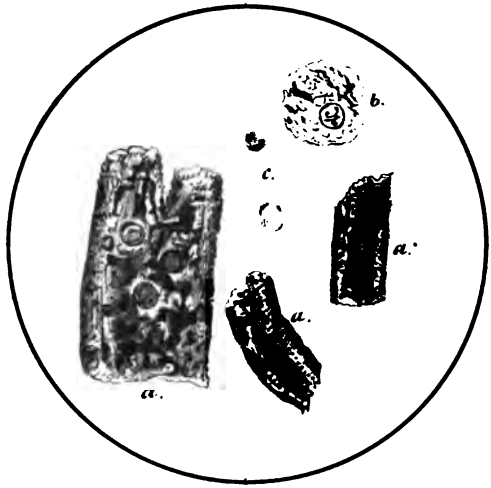
Urine and Liver.

3



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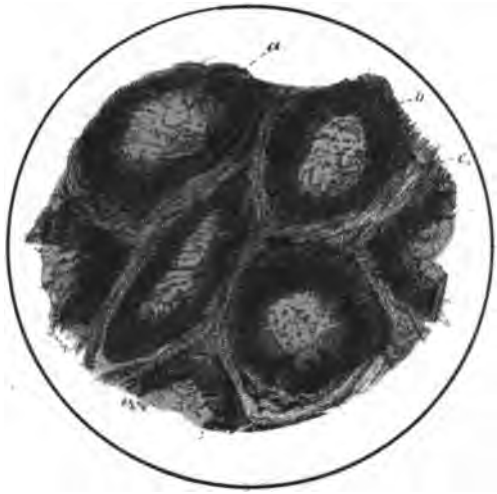

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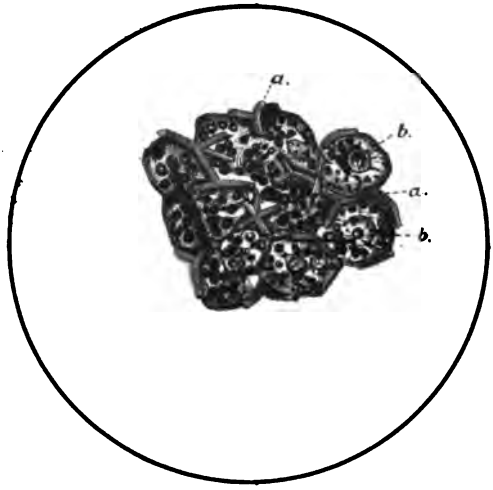
Reticulum of Bile-ducts.

4½



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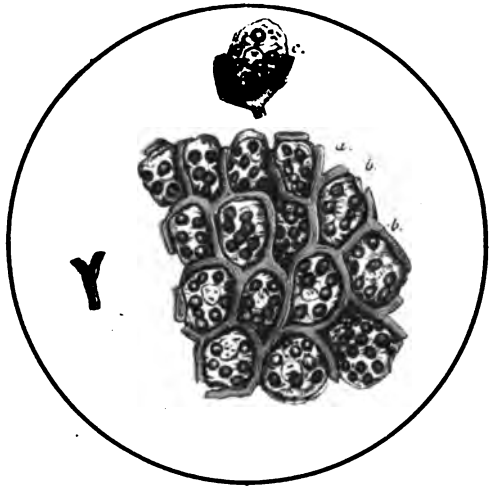

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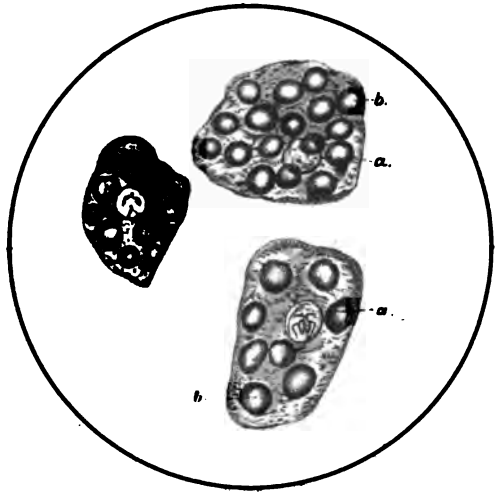
Liver and Kidney.

6



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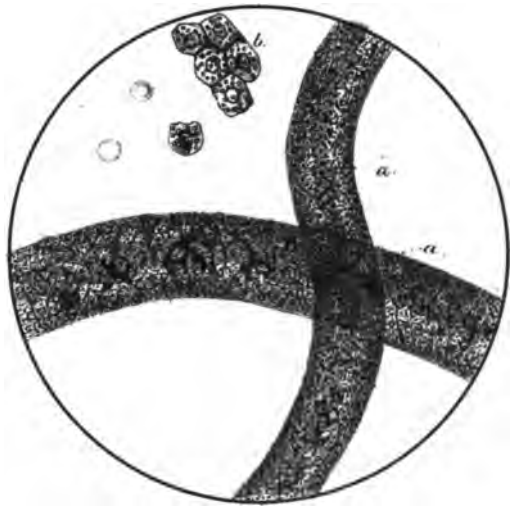

[illegible] Albany, N. Y.

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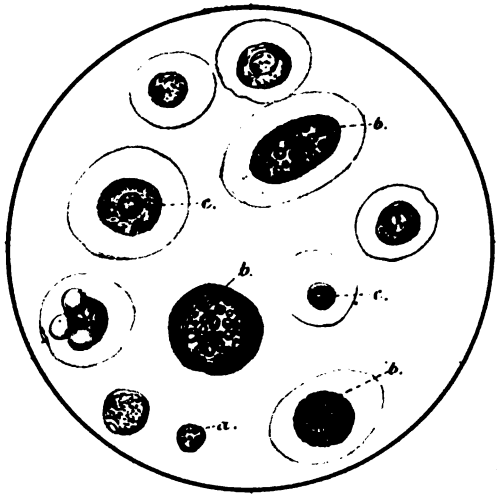
Spleen of disease & convalescence

8



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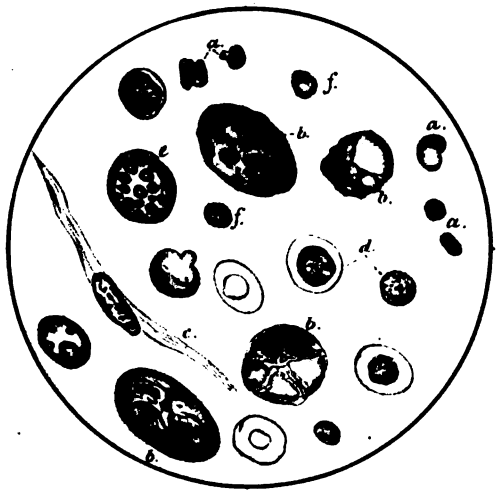

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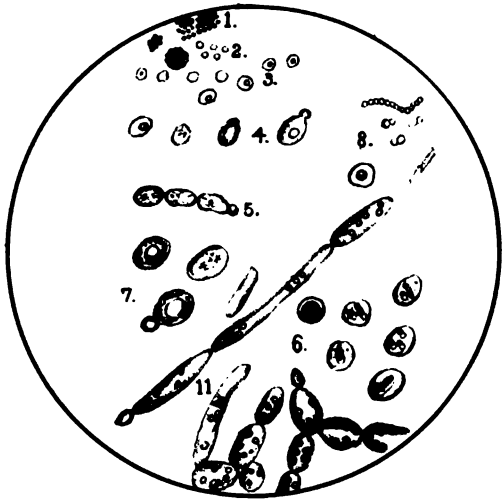
Micrococcus of Bile.

10



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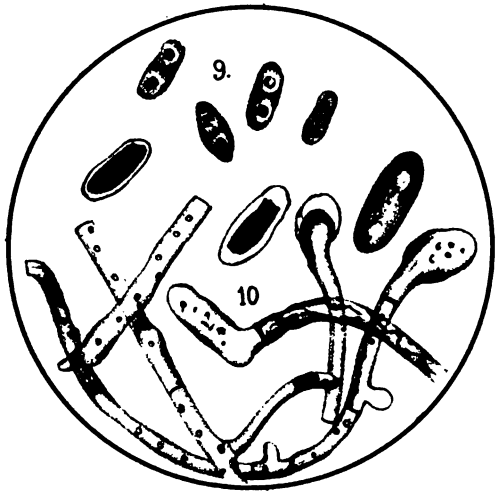

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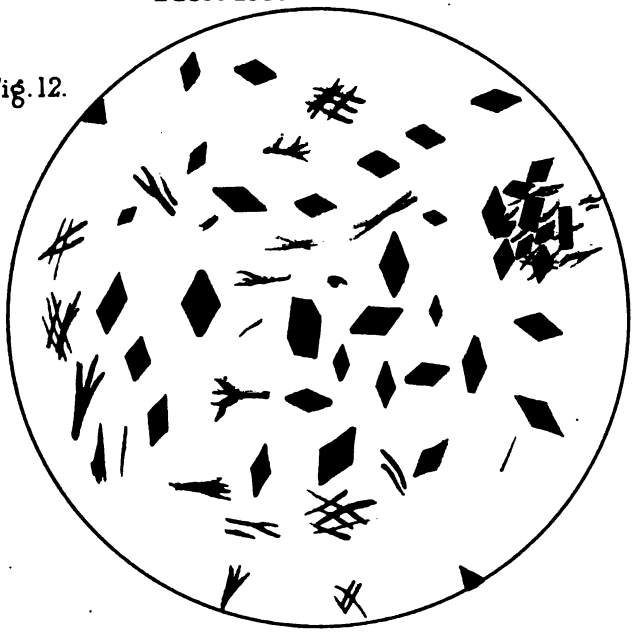
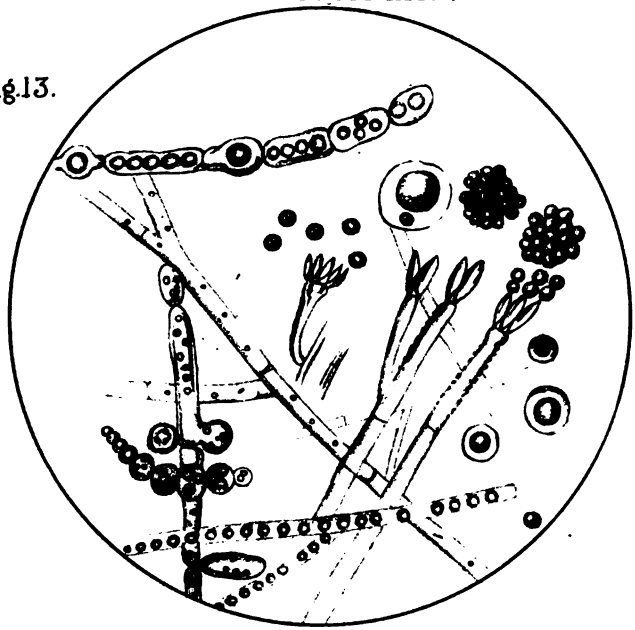
Haematöidine.

Fig. 12.



Penicillium.

Fig. 13.



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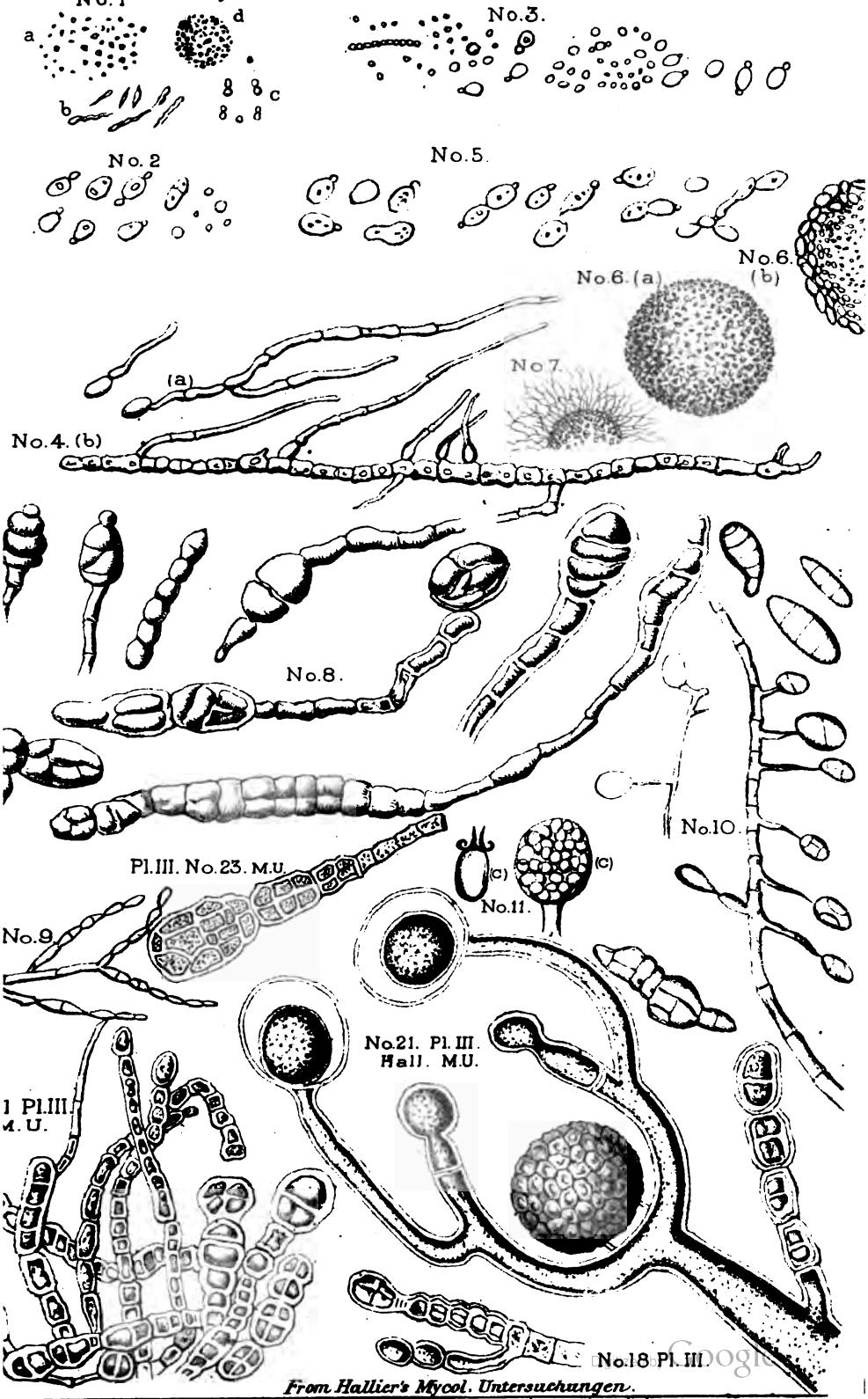
Lithographed from Sketches of Coniothecium by E. Hallier.



From Hallier's Mycol. Untersuchungen.

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